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THE AUTOMOBILE

# FRANCE HOLDS A RELIABILITY RUN

BY W. F. BRADLEY

PARIS, Dec. 9—France is holding an automobile realiability trial. It has adopted both the idea and the word from across the English Channel, and explains that the foreign word means "that in which you can have confidence." Thus, as confidence needs to be established more in the smaller types of cars than in their big brethren, the trial has been limited to voiturettes, with dimensions fixed at 4.9 by 5.9 for a single-cylinder engine, 3.9 by 4.1 for a twin, and 3.1 by 4.7 for a four-cylinder motor.

The reliability trial is simplicity itself; 15 daily stages, totalling 2,000 miles, to be covered at an average speed of not less than 15½ miles an hour, with no other stoppages than filling gasoline, oil and water tanks and changing tires when necessary. As each day's run is finished the car is pushed into a closed garage and locked up until the official starting hour in the morning. Six courses have been selected, but the particular one to be followed is never made known until a few minutes before the start. To come through with a clean score practically amounts to a sealed bonnet competition, but in order not to decimate the ranks too much it is allowed to clean spark plugs, carbureter in case of obstruction, tighten nuts and adjust brakes and driving chains without penalization. Any other work on the car entails the loss of points.

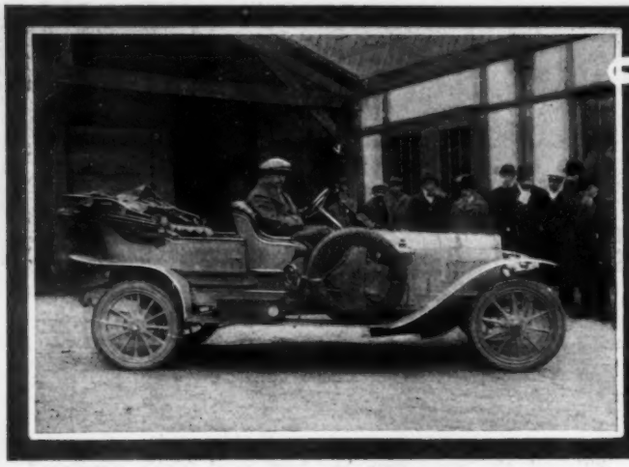
Thirty-three small cars entered for the trials, but on the Sunday morning appointed for the start the number had been reduced to 29 actual competitors, the firms represented being Sizaire-Naudin, Gregoire, Delage, Alcyon, Hurtu, Corre-La Licorne, Barré, Demeester, Doriot-Flandrin-Parant, Turicum, Fouillaron, Rolland-Pilain, and Zenith. This list comprises all of the French voiturette constructors of any importance with the exception of one.

Although the one-lunger has been most highly developed in France for small-car work, it is somewhat surprising to find that they are in a decided minority in this competition. There are only six single-cylinder cars, compared with 23 fours, and no twins. The only firm putting in a full team of single-cylinder cars is Sizaire-Naudin; even they are about to start the construction of a four. Doriot-Flandrin-Parant has one single and two fours, and the others in the one-lunger class are Hurtu and Fouillaron. It would not be safe to conclude from this that the one-lungers are going out of use, but rather that the manufacturers have more confidence in their fours, or prefer to push them in preference to the singles, the public demand for the former being greater.

Delage No. 7, Driven by Haye, Passing the Barre Car in the Climb of the Cote de Bonnieres

From an external examination only it would be impossible for the most expert automobilist to distinguish the ones from the fours. Ninety-nine men out of a hundred would swear, indeed, that the single-cylinder Sizaire-Naudin had a multiple-cylinder motor under its bonnet, while the Doriot-Parant single is an exact counterpart externally of its four-cylinder brethren. If anything, the single cylinders are quieter than the fours, for the former are well muffled, while the latter have that peculiar ring of a small high-speed four-cylinder motor with its exhaust not completely muffled.

Although 15½ miles an hour is all that is required of the cars, no driver is satisfied with such a crawl. On the first two days the average speed of the conservative drivers was 25 miles an hour, while some of the daredevils went very much higher. There was not a single case of failure to make the controls on time, though



Georges Sizaire on the One-Lunger Sizaire & Naudin


Four-Cylinder Zenity—Friction Transmission, Shaft Drive

several failed by reason of minor adjustments which were not allowed under the rules. Although the roads are particularly heavy by reason of persistent storms, it is certain that several will come through with a clean score, and elimination is likely to be caused more by reason of small adjustments than for serious mechanical defects.

One of the most important conditions is that the cars shall be completely fitted with hood, wind shield, running boards, lamps, etc., as for winter touring. In the majority of cases this regulation has been strictly adhered to. A four-cylinder Corre-La Licorne, indeed, with an engine only measuring 3.1 by 4.3 inches bore and stroke, has a closed four-passenger inside-steering body of a nature that is not usually classed with voiturettes. In several cases the letter of the law rather than its spirit has been adhered to, the wind shields being mere apologies for this article. Most, however, are fairly well fitted, though passengers' comfort has not been so well considered on the open touring car as by the English neighbors. The sides of the bodies are too low, side doors are not used, and there is a lack of adequate protection.

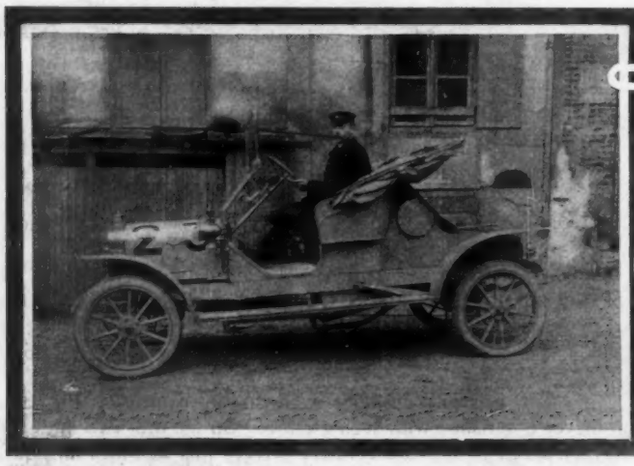
Mechanically there is not a great deal of variety in the competing vehicles. Large car lines are followed in the majority of cases for both external and internal features. The four-cylinder motors are for the most part in a single casting, the bore varying from 2½ in. to the maximum of 3.1 in. A long stroke is generally favored. High-tension magneto, without batteries as a standby, is to be found on every car in the competition. There are two cases of friction transmission, in one of which the final drive is by single chain and in the other by cardan shaft. In price the voiturettes vary from $850 to $1,200 complete.

The first two days of the trial resulted in six small cars receiving penalization. In each case the defects were minor ones, which did not prevent the cars reaching control on time. Georges Sizaire broke a spring clip; the radiator fan belt jumped its pulley on a Barré car, one Doriot-Flandrin had to tighten up a nut on the intake pipe, and another of the same make had a leaky radiator; a Turicum had to tighten up nuts on its friction plate, and the driver of a Fouillaron stayed outside the garage, filling tanks and looking over his car, until his time had passed.

## AMERICA'S STOCK CAR SUGGESTIONS NOT ADOPTED

PARIS, Dec. 15—America's suggestions for stock car races were not adopted at the International Conference of Recognized Automobile Clubs. William S. Hogan received the proposals from the Automobile Club of America too late to give the necessary three weeks' notice, with the result that the matter was introduced to the meeting, but could not be discussed.

To judge from expressions of opinion gathered from the European manufacturers, the American method has little likelihood of finding favor here. Purely stock-car races never have been held in any country of Europe, speed events here being an opportunity of trying out new ideas and not of testing the standard product. Further, Europe is opposed to a piston displacement rule. Such



Turicum Four-Cylinder with Single Chain Drive


Four-Passenger Corre-La Licorne—Inside Steering Body

good results have been obtained by classifying cars according to cylinder bore only, leaving manufacturers to adopt as long a stroke as possible, that it would be impossible to convert the European to a rule tending to development of short-stroke engines.

The most important work of the conference was in connection with an international triptyque. The Touring Club of Italy had proposed through its spokesman, the Automobile Club of the same country, that an international triptyque should take the place of the numerous national documents now in use. The matter has been before the road conference and the recent government conference, and there met with approval. The recognized automobile clubs, in order to help the matter forward to a practical issue, decided that each club should study the matter and present a detailed scheme for the realization of an international triptyque at the February 1 gathering of the conference. At the same time they should use their influence with their respective governments toward the adoption of a scheme having for its object the creation of an international automobile passport. There is no real opposition to the Italian scheme, but there are plenty of objections on the part of officialdom against doing things in a way that is not in accordance with their routine. As the scheme would provide an open door into every country in Europe merely on the accomplishment of a single formality, it is one that is worth working for. America's interest in it is real, for she provides a large proportion of the automobilists who travel annually over the highways of the Old World.

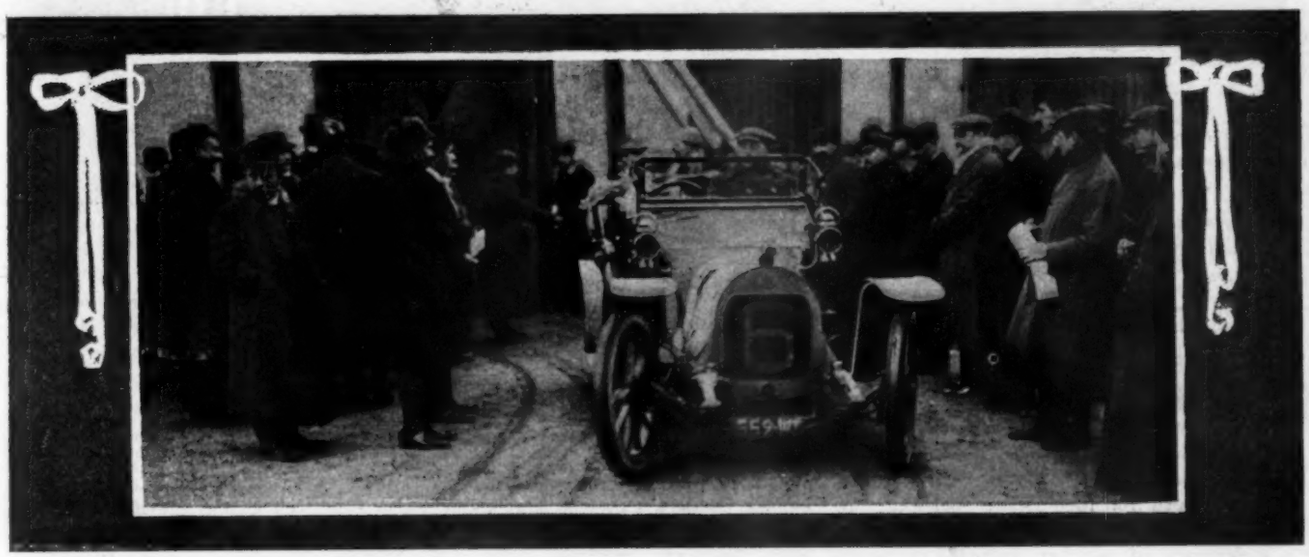
John Bull has reason to be satisfied with the results of the meeting, for it was decided that the automatic electric timing apparatus in which he is interested shall be given official recognition, and this or a similar type of instrument made compulsory for all races, either on road or track, of less than five kilometres distance. Colonel Holden, a member of the Royal Automobile Club of Great Britain, invented a timing machine which automatically recorded the passage of a car, and did it so well that the passage of the front and rear wheels was separately recorded at speeds of 80 miles an hour. The machine was proposed for compulsory adoption, but not immediately accepted. Now it has been decided that this method of timing shall be employed wherever it is desired that the records shall have official recognition. In order not to give the English colonel a monopoly, the conference declared that any type of automatic machine could be employed provided it was capable of recording one-fifth of a second.

The relations between the National Automobile and the National Aero clubs is a matter now troubling Europe, and have been placed in the hands of a special committee.

## NINE VEHICLES SUCCEED IN MILITARY TRIALS

PARIS, Dec. 15—Intimation has been given by the Minister of War that nine different types of automobiles proved satisfactory in the recent commercial and military trials held by the Automobile Club of France, and have met with the approval of the military jury. As soon as the necessary funds have been voted by Parliament, and this will be done within a few weeks, these nine types can be offered to private users with the advantage of a subsidy on condition that their owners guarantee to present them for annual inspection and to place them in the hands of the army in case of mobilization. The subsidies amount to $600 per vehicle for the first year and $200 for each of the three succeeding years. All that the army requires is that the subsidized vehicles shall be similar in every respect to those presented in the competition. This will give France a fleet of commercial automobiles ready for army purposes at a moment's call, and always kept in the best of condition, the annual inspection and the fact that they are employed for ordinary commercial purposes assuring this.

The vehicles selected are two four-cylinder Aries trucks carrying three-ton loads; two four-cylinder Aries carrying four-ton loads; a 15-horsepower three-ton two-cylinder Delahaye; two four-cylinder Delahaye trucks, each taking four-ton loads; two Berliet, two two-cylinder Cohendet, two De Dion, two Saurer, and two Vinot-Duguingand.



Gregoire Voiturette Leaving Garage to Compete in the French Reliability Trials

## STRIKE OF HARTFORD TIREMAKERS

HARTFORD, CONN., Dec. 21—As a result of a wage cut, about 100 tiremakers at the Hartford Rubber Works Company went on strike this morning. The strike proper began Monday morning, when a number of the tire builders failed to show up for work. The factory has been running twenty-four hours a day for some time, so that there are two shifts of workmen. Those in to-day's demonstration were of the day force. Rumors of advanced prices in crude rubber have been spread for some time, and it was said might be used as a reason for a general wage reduction. No definite cause has been stated as yet. The local tiremakers are paid by the day—earning from $1.75 to $3—and the cut, which ranges from 15 to 33⅓ per cent., averages 24 per cent. for the whole body. The tire builders have no union, and this phase does not enter into the question. The strikers congregated at the works this morning and induced others to join them, and then formed a demonstration and marched to a nearby hall for a prolonged meeting.

Justen D. Anderson, president of the Hartford Rubber Works Company, when asked as to the strike, said that he had nothing to say.

Aitken, Driving the National, Broke All American Records for Stock Cars

# SPEEDWAY RECORDS DESPITE ZERO WEATHER

INDIANAPOLIS, Dec. 18—Considering the weather conditions, the speed trials on the Indianapolis Motor Speedway yesterday and to-day could be termed eminently successful. The events, which were the first on the course since the track has been paved with brick, merely gave an indication of what may be expected when the weather is more favorable.

The speedway management, in fact, is fairly well satisfied with the results. With the thermometer hovering near the zero mark, causing frequent carbureter trouble, and with the drivers suffering from the intense cold, some remarkable time was made. The most notable feat was that of Strang in his 120-horsepower Fiat covering five miles in 3:17.70, establishing a new record, the former record for thed istance being 4:11.3, held by Oldfield and established on the local course last August.

Inclemency of weather detracted somewhat from the mass of interested spectators, yet the total attendance was quite satisfactory, being of the substantial sort, to whom a little detail like zero weather would have but small influence in the face of the expected performance, nor can it be claimed that they were disappointed. Then, there were opening speeches, congratulatory opportunities, the meeting of workers in the vineyard, they who stood shoulder to shoulder in the good fight.

### Ceremonial Placing of the Last Brick

Just prior to the first trials yesterday afternoon, the ceremony of placing the last brick in the course was held in front of the judge's stand, at the finish line. This brick is of coin silver, plated with gold and weighs about fifty-two pounds. It was placed in position by Governor Thomas R. Marshall, assisted by his private secretary, Mark Thistlethwaite.

Stillman, Warmly Hooded, at the Wheel of the Marmon

Newell Motsinger, driving a 20-horsepower Empire, was the first to start after a record on the new brick course. He entered in the class for cars having a piston displacement of 160 cubic inches and under, and was the only entrant. Summary of the afternoon:

Class 5—160 inches and under piston displacement—Empire No. 10 (driven by Newell Motsinger, only entrant), one-fourth mile in 18.73 seconds, one-half mile in 38.18 seconds, one kilometer in 48.31 seconds, one mile in 1 minute 20.46 seconds.

Class 4—161 to 230 cubic inches piston displacement—Cole No. 9 (driven by Endicott, only starter), one-fourth mile in 15.69 seconds, one-half mile in 31.70 seconds, one kilometer in 39.88 seconds, one mile in 1 minute 05.97 seconds.

Class 2—301 to 450 cubic inches piston displacement—National No. 5 (Aitken, driver), one-fourth mile in 11.60 seconds, one-half mile in 23.20 seconds, one kilometer in 30.20 seconds, one mile in 49.20 seconds.

National No. 4 (Kincade, driver)—One-fourth mile in 11.80 seconds, one-half mile in 22.60 seconds, one kilometer in 30.20 seconds, one mile in 50 seconds.

Class 1—451 to 600 cubic inches piston displacement—Packard No. 12 (O'Donnell, driver, only starter)—One-half mile in 27.80 seconds, one mile in 58.60 seconds.

**Free-for-all, Flying Start**

| Car and Driver | 1-4 | 1-2 | Kil. | Mile |
|---|---|---|---|---|
| Christie (Christie) | :08.78 | :18.13 | :23.91 | :47.06 |
| Christie (Christie) | :09.02 | :19.17 | | :46.22 |
| Fiat (Strang) | :11.60 | :21.96 | | :46.18 |
| Fiat (Strang) | :09.10 | :18.84 | | :40.61 |
| Fiat (Strang) | :09.21 | :18.83 | Time not taken | |
| National (Aitken) | :14.99 | :21.04 | :23.13 | :50.53 |
| National, 6 cylinder (Aitken) | :09.81 | :21.08 | | :45.00 |
| Motorcycles | | | | |
| Indian (Huyck) | :12.22 | :25.02 | | :54.38 |
| Indian (Huyck) | :12.85 | :25.51 | | :52.60 |
| Thor (J. Merz) | | | | :54.56 |
| Thor (J. Sink) | | | | 1:04.28 |

**Free-for-all, Twenty Miles**

| Car and Driver | 5 | 10 | 15 | 20 |
|---|---|---|---|---|
| No. 5. National, 40-hp. (Aitken) | 4:06.56 | 8:12.10 | 12:17.01 | 16:18.41 |
| No. 4. National, 40-hp. (Kincaid) | 4:04.73 | 8:10.60 | Gasoline gave out | |
| No. 9. Cole, 30 (Endicott) | 5:20.51 | 10:41.35 | 16:02.44 | 21:22.11 |
| No. 10. Empire, 20 (Motsinger) | 6:28.14 | 12:45.22 | 19:13.27 | 25:50.43 |
| No. 6. Marmon, 32 (Stillman) | 4:17.40 | 8:33.10 | 12:47.10 | 17:03.74 |
| No. 7. Marmon, 32 (Marmon) | 4:25.88 | 8:50.83 | 13:21.20 | 17:52.88 |
| No. 12. Packard, 30 (O'Donnell) | 4:42.69 | 9:23.35 | 13:59.81 | 18:43.83 |

### Strang's Five Miles Fastest on Saturday

The sun to-day was a bit warmer, but nevertheless the wind made driving decidedly unpleasant. Nothing longer than five miles was attempted, in which, however, a new record was estab-

lished for one mile on the track, and also a new record for five miles. These trials, briefly summarized, were as follows:

| Car and Driver | 1-4 | 1-2 | Kil. | Mile |
|---|---|---|---|---|
| Christie (Christie | :09.04 | :18.11 | | :50.10 |
| Christie (Christie) | :08.92 | :18.23 | :24.50 | :42.58 |
| Christie (Christie) | :08.37 | :17.53 | :22.86 | :43.03 |
| Christie (Christie) | :08.70 | :18.08 | :23.45 | :43.77 |
| Fiat (Strang) | :09.07 | :18.62 | :23.65 | :39.21 |
| Fiat (Strang) | :08.92 | :18.39 | :23.36 | :39.36 |
| Empire, 20 (Motsinger) | | | | 1:17.03 |

Strang's time for the five miles—3:17.70—was easily the sensation of the meet. He had a flying start before starting on the five miles. This mile flying start was as follows: One-fourth mile, :08.05; one-half mile, :17.82; one kilometer, :22.70, and the mile, :40.02. His first mile of the five miles is given above, being in :39.96. His time for the first lap of two and one-half miles was 1:38.80. The first mile of the second lap was made in :39.66, the quarter of this mile being :09.02; the half, :18.62, and the kilometer, :23.52.

The drivers suffered intensely from the cold. Despite the fact that they wore heavy gloves and had their faces protected by woolen bandages they were almost frozen during the trials. When they stopped their cars they could scarcely move their bodies and frequently had to be lifted out. Once after Strang had completed a trial he found his face was almost frozen and washed it in the icy water of the stream that runs nearby.

C. H. Werner, of the Werner Instrument Company, Beloit, Wis., had charge of the timing. The same special Werner timing device that gave such excellent satisfaction at the previous local meet, as well as at the one at Atlanta, was used. Only once was trouble encountered, and that was when the one kilometer wire was damaged.

Officials of the meet were: Honorary referee, Gov. Thomas R. Marshall; referee, Frank H. Martin, Chicago; starter, Fred J. Wagner, New York City; announcer, E. A. Moross; paddock manager, O. G. Temme, Chicago; board of judges, C. G. Sinsbaugh, Chicago, Robert H. Kramer, Mudlavia, Charles Root, Chicago, Thos. Hay, Chicago; board of timers, F. W. Kohl, Cleveland, Frank Remy, Anderson; scorer, John S. Cox, Terre Haute; timing director, C. H. Werner; representative of racing board of A. A. A., C. W. Sedwick; clerk of course, W. H. Wellman; director of contests, E. A. Moross, Indianapolis.

The trials were with the sanction of the A. A. A. Not a single accident marred the two days' events, and from indications, as it would seem, this track will have a vast influence on the future of racing, partly because of the new records, which were established under adverse conditions, and again, since safety is established under speed conditions. That the banking angle, as

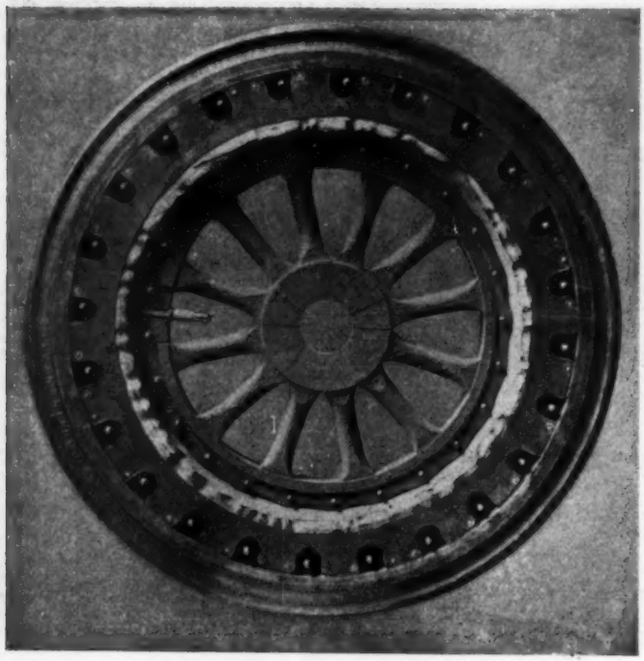
Strang at Wheel of Record-Breaking 200-Horsepower Fiat

it obtains at Indianapolis, is a wise one, seems to be proven, and those who may have had to struggle with this important matter will fully appreciate how apparently simple it looks to fix the angle of banking, and yet, in an actual trial the simple fixing fails to deliver satisfaction.

Despite the exactness with which the present angle of banking seems to satisfy the conditions of racing, which angle, it will be remembered, is maximum at 36° 40", other means of safeguarding the course are available, as for illustration, the buttresses are reinforced, all around the curves, as shown in the title illustration, so that they project up, and above, some 33 inches. These reinforcements are of concrete, with a 9-inch thickness of wall at the top, tapering off to give strength and stability. Under the new conditions safety is further assured. due to a 15-foot sweep on each side of the brickway, the same having been leveled off after having been filled in with a depth of filling, the same having the characteristic of rolling down firm, and the further property of remaining so, even under conditions of protracted inclement weather. This wide sweep on each side of the track assures that a disabled car going at top speed will have a wide field in which motion may be arrested, thus affording the driver and his mechanician reasonable opportunity.

The management is to be congratulated for its persistence, having expended a vast sum of money in brick-paving the track, after it was found that no other class of pavement could be regarded as safe, considering the possible speeds of modern racing automobiles. That all records will be broken, under fair conditions of weather, is now assured.

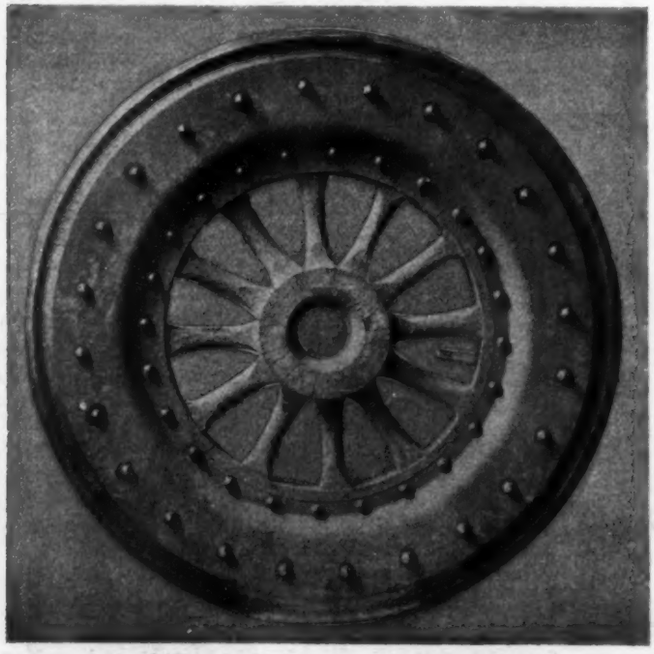
Governor Marshall, of Indiana, Placing the Golden Paver Which Completed the Track Into Its Position



Yielding Wheel with Steel Side Plates Removed

## ANOTHER FRENCH SPRING TRUCK WHEEL

PARIS, Dec. 8—France, always active in the spring wheel line, has produced another. This one, shown in the two accompanying pictures, is not strictly a spring wheel, in that no springs are used, at least springs do not form the major part of the design. They do, however, belong in the same class, for the idea is to do away with pneumatic tires. As the illustrations show, there is an outer tread of hard rubber, within which a layer of soft rubber forms a yielding felloe. The latter is made in many small sections, with holes through them, through which holes the bolts to hold on the steel side plates pass. Below this, in turn, there is another felloe of wood, attached to the ends of the spokes in the usual manner. But between the two is a sort of air bag, which may be inflated somewhat, increasing the yielding effect of the whole wheel, which is the desired object.



Same Spring Wheel Complete Ready for Use

## OLYMPIA SETS NEW BODY FASHIONS

LONDON, Dec. 7—As was stated in the last report of the mechanical features of Olympia, chassis fashions have not altered greatly, except in details. The same thing, however, cannot be said about the carriage work, for on all sides there is evidence of great improvement. The reason for this is not far to seek. In previous years the attention of both manufacturer and user has been centered on the "machinery" to such an extent that there has been comparatively little interest available for the body builders' department; but now the chassis is becoming less in need of continual improvement, and, in consequence, the importance of the carriage portion of the car has grown considerably.

In open cars, the striking features are general adoption of high side doors for the front seats, and the prevalence of the flush-side, or torpedo style of body. These side doors make such a distinct improvement, both in comfort and in appearance, that it seems surprising that all bodies were not thus fitted long ago. To afford a maximum of comfort, the doors must be as high as the arm rests of the front seats, and the result is that with a very short body or a carelessly designed two-seater, the effect may not be pleasant to the eye. With this exception, however, the front doors may be taken to be a very material improvement.

The flush-sided body is immensely popular, and, as might be expected, there is much rivalry between makers as to which was the originator of the type. Captain Masui, of the Germain Company and the Hewer Body Company, Coventry, seem between them to have been the responsible parties, but it is interesting to note, as showing the quick development of the type, that no example can be traced previously to the summer of 1908.

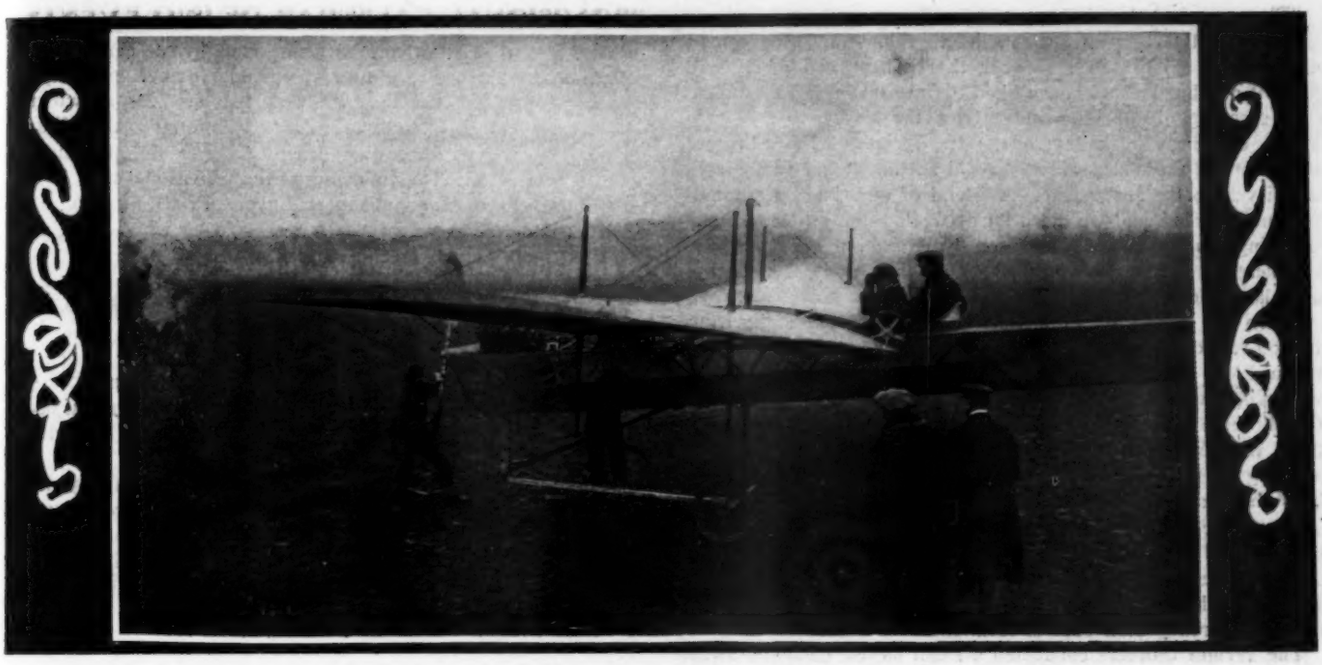
There are many varieties to be seen—some of which bear but little resemblance to the original type. To be most effective the body must be joined on to the bonnet by a sloping line, so that the top of the car may present an unbroken outline from the radiator to the hood at the rear. Hence, it will be recognized that this body is seen to best effect when the front of the car is on Renault lines, or, if otherwise, when the bonnet and radiator are higher than the average. The former case is well exemplified by the Arrol-Johnston, the latter by the Hobson car

A special feature in favor of the flush-sided body is that it can be made specially light, for the framework can consist of a properly braced wooden skeleton with sheet metal panelling In passing it may be stated that aluminum is becoming less popular as a material for panelling, its place being taken by sheet steel.

There also seems to be, this year, an increase in the proportion of covered cars, not only in the case of town carriages, but in touring vehicles also. Popular opinion favors the convertible type, such as the landaulet or the cabriolet rather than the limousine. The cabriolet, in particular, is becoming fashionable, somewhat in the same way as the torpedo in the open body section. A year ago it was the exception to meet with a body of the cabriolet type, but at the present exhibitions there are a dozen staged by various makers. It is unquestionably more expensive to make than either the limousine or the laudaulet, but its great advantage as a completely convertible carriage is likely to make it come into general favor with users of high priced cars. More than this, it fills a special field midway between the enclosed and open bodies, in large establishments, having a distinct usefulness for afternoon strictly of its own.

Other noticeable advances are the general use of electric lighting for cars of every type, and also the provision, in many cases, of a black leather hood in place of the cape cart hood of canvas almost invariably used before.

Luggage carriers at the rear of the covered cars are now usually fitted, instead of the grid on top of the body. When a rear petrol tank is fitted the filling orifice is arranged at the side in such a way that it is accessible without removing the luggage.



Latham with a Pupil in Antoinette Two-Seated Monoplane, Which He Calls "The Taxicab"

# YOUNGER FARMAN MAKES CROSS-COUNTRY RECORD

PARIS, Dec. 10—Maurice Farman, younger brother of the aviator Henry, now holds the world's record for long-distance cross-country flying. Starting from his shed at Buc, about twelve miles from Paris, he made an uninterrupted flight as far as the suburbs of Chartres, 44 miles away, in the record time of 59 minutes. His average height was 280 feet.

Maurice Farman has had his flight in view for over a month, but owing to bad weather has not been able to put it into execution earlier. After heavy storms a complete calm prevailed yesterday, the biplane was brought out, quickly prepared, and at 3 o'clock in the afternoon soared away for the city on the Beauce plain. Owing to the uneven nature of the country, Farman did not steer a perfect straight course, but at the outset flew westward, instead of southwest, in order to get directly over the main road from Versailles to Rambouillet, which lies in level country. After crossing the forest of Rambouillet, sacred to the presidents of France, the Cathedral of Chartres could be seen nearly thirty miles away. The country was level with the exception of a portion just outside Chartres, where a deep valley had to be crossed. The main road and the railway served to guide the aviator, who took up a course between the two, and was clearly visible to the occupants of the trains.

It is very probable that Farman will continue his journey as far as Bordeaux, nearly 300 miles from Paris, taking it in several stages. There is a fascination about a flight from Paris to Bordeaux, for it is over this road that the first long-distance cycle races were held and later some important automobile races.

Maurice Farman's biplane is a machine of his own design built for him at the Mallet factory. In general features it resembles the aeroplane employed by his brother Henry, though its details are distinctive, and are entirely the outcome of Maurice Farman's personal research. The motor is an eight-cylinder air-cooled Renault, with the cylinders in V. In order to obtain a slow-speed propeller without the use of special reducing gear, the camshaft is strengthened considerably and receives the propeller on its extension. The propeller is a two-bladed type built by Chauvière, having a diameter of 8 feet 3 inches, and turning at 700 revolutions a minute. This is the first occasion on which the Renault motor has been used for an aerial flight of any importance. Farman declares himself thoroughly satisfied with his motor, but he is responsible for much of its success, by reason of the detail modifications he has made and his careful tuning-up.

Maurice Farman, the youngest of the three brothers, is a pioneer in the automobile world. Before the self-propelled vehicle came into existence he was a successful cyclist, forming a team with his brother Henry, which could never be beaten. He entered the automobile industry as soon as it sprang up, driving high-powered cars in most of the early races, generally for Panhard-Levassor. He is now at the head of the Palais d'Automobile, together with M. Neubauer, his establishment being by far the largest automobile garage in Paris. Maurice Farman was a balloonist before becoming an aeroplanist, at one time holding the French record for long-distance travel. All his aerial experiments have been carried out in the spare time obtainable from his business, this explaining the slower rate of progress compared with his brother Henry.

## TWO HOURS' PRACTICE MAKES AN AVIATOR

DETROIT, Dec. 20—"Driving an aeroplane is a matter of two hours of practice," said Wilbur Wright during his visit here to attend the organization of the Aero Club of Detroit. "I can take a man up and in two hours he will know enough to run the machine. You ask why it is that men did not operate aeroplanes before. I will tell you. Men did not have the art of balance, they did not know how. That is all. We brought out the aeroplane and gave to the plane a balance which made things possible that were not possible before. I do not know that you were ever caught on a cake of ice in midstream. The ice, if so, rocked with you. When it tipped one way you naturally went across to the other side to bring it to a balance and then you went to the center to hold that balance. It is a good way that way with an aeroplane."

"But they say that you have not really shown the possibilities of the aeroplane and that you have held back in your demonstrations; in other words, that you have never shown the real possibilities of the aeroplane in flight?"

"That is not altogether true, for we have made some flights which should have shown the possibilities of the machine. However, greater things are coming than any that have been seen."

"It was too bad that you should have had trouble at New York when you might have sailed around the city." Wright answered:

"That was bad, but it happened on the ground, and had my engine have blown out a head in the air things might have been different. I am glad, rather glad, that it happened where and when it did, but I should have liked to have made that flight."

In speaking of the jump made from the bicycle to the aeroplane, escaping the automobile, Mr. Wright, whose brother smiled at the thoughts, said: "We did not altogether jump from the bicycle to the automobile. A friend of ours had an automobile in Columbus and we did a lot of work helping him to make the thing run. Then we planned on flying and our interest in the troublesome automobile vanished. Our time was given to the aeroplane and to experiments."

When the subject of Tillinghast and his reported flight from Boston to New York and back with two other men was broached to him, Mr. Wright said: "I did not read that story at all. I was called up by a New York paper with regard to it and had to tell them that. However, I do not really believe that that flight was made. It is, of course, true that lots of people are working on aeroplanes throughout the United States, and perhaps they have struck it as we did; but from Boston to New York and return with the motor going wrong in the air and being repaired without alighting, never."

Approached in regard to a location in Detroit for an aeroplane factory, both Wrights refused to talk outside of stating that they had already seen several locations.

The Wright brothers conducted a small bicycle company away back in 1893 and 1894 at Columbus, O. "It's a far flight from then until now," laughed Wilbur Wright, "for when we made bicycles to run on the ground we hardly planned to some day ride in the air, but we are doing so now. That was one great day, the days of the bicycle, but this is another, and we have just skipped over the automobile day, spending our time, while others made fortunes in automobiles, in developing the third stage, the aeroplane."

When the subject of his participating in flights during the coming year was brought up to him, Orville Wright said: "We shall undoubtedly delegate most of that to others and attend to business. The demands upon us for business will compel us to retire from the field of contest. However, there is altogether too much enjoyment in a real flight to ever keep us out of the air. Our flights will be made in private, however. It is not really our intention to take part in public contests."

Both of the Messrs. Wright laughed over the efforts of the photographers to get into touch with them while they were at work at Kittyhawk, N. C., experimenting with gliders. "There was one photographer down there (it was Jimmy Hare of Collier's) who laid low day after day for us and got something. Others have followed the same tactics since. We are now rather accustomed to being photographed and do not mind it so much. But some men with cameras are an awful nuisance."

## AUSTRIA'S FIRST STEPS IN AVIATION

BERLIN, Dec. 11—Austria's first home-made aeroplane has stood its primary test well on the aviation ground near Vienna, where it achieved a flight of nearly five kilometers, guided by the constructor, Etrich.

Berlin's example in opening an aero section in the Post museum might well be copied by other large cities, for it is a decided step in the right direction. The postal authorities have placed an order for models of four aeroplanes and two airships with a local firm, and permission has been requested from the war office to carry out a replica of the Gross as well as the Zeppelin and Parseval already ordered. The aeroplanes are copies of the Wright, Blériot, Latham and Grade flyers, and will be exact in every detail, even the same kind of wood being used as in the originals. All the aeroplanes are to be one meter in length and one-and-a-half over all, while the Zeppelin is a seven-meter copy of Zeppelin III, and the Parseval on the same scale proportionate to the original. Each part is to be numbered and full information given on a table over each apparatus.

## PROVISIONAL CALENDAR OF 1910 EVENTS

PARIS, Dec. 16.—An attempt is being made by the aeronautical associations of Europe to draw up a calendar of events for 1910 in order to prevent clashing. The first list has been drawn up by the Aero Club of France, and will be submitted to the Mixed Commission in order to be modified by them if any clashing is likely to take place. The following is the provisional list:

February 6 to 13, Heliopolis meet, Egypt. Prizes, $42,400.
April 1 and 2, Biarritz meet. Prizes, $40,000.
April 3 to 10, Cannes meet. Prizes, $1,600.
April 15 to 25, Nice meet. Prizes, $48,000.
May 7 to 9, Croix d'Hins, Bordeaux, meet. Prizes, $8,000.
May 14 to 22, Lyons meet. Prizes, $30,000.
June 5 to 12, Vichy meet. Prizes, $6,000.
July 3 to 10, Elimination race for Gordon Bennett contest.
Sept. 4 to 11, Croix d'Hins, Bordeaux, meet. Prizes, $40,000.
Sept. 23 to 30, flight from Havre to Trouville and Deauville, across mouth of River Seine. Prizes, $40,000.

In addition to these events, with a total prize list of $256,000, there are several others not yet included on the programme, among them being the second Rheims meeting and the Automobile Club of France's flight from Paris to Brussels. Prizes which are eligible for competition any time during the year are not included in the programme.

## SEEK PERMIT FOR LOS ANGELES MEET

Action on the application of the Aero Club of Los Angeles for a license for an aeronautic meet in that city will be taken at a meeting of the board of directors of the Aero Club of America December 22. The proposed meet is supported by both the Los Angeles Club and the Merchants' Society, and as the principal desideratum in the granting of a license is the financial responsibility of the promoters, it is highly probable that Los Angeles will get the meet.

The meeting is intended to begin January 3 and last ten days, and $80,000 prize money has been raised. Louis Paulhan, the French aviator, has been engaged, and sailed from France Tuesday. Glenn Curtiss will also appear, and it is said that there may be no less than six Curtiss machines present. Their pilots, besides Mr. Curtiss, will be C. F. Willard, C. K. Hamilton, C. B. Harmon, A. P. Warner and M. de Riemsdyk, a Netherlandish aviator who has been flying at Hammondsport, N. Y., recently.

## ALEXANDER WINTON BUYS AN ANTOINETTE

CLEVELAND, Dec. 17—During his recent European trip Alexander Winton, the president of the Winton Motor Carriage Company, ordered a 50-horsepower Antoinette monoplane, which is to be delivered in this country next May. This machine is of the type with which Latham holds the present world's record for altitude. The standard Antoinette machine measures 36 feet across the wings and 34 feet from propeller to rudder. It has 280 square feet of supporting surface and weighs 1190 pounds

## ROCHESTER, N. Y., AERO CLUB FORMED

ROCHESTER, N. Y., Dec. 17—The Aero Club of Rochester was formally organized here last night with a membership of sixty-five. President Taft, Governor Hughes and the Mayor of Rochester are honorary members, ex-officio. Incorporation papers have been prepared, and will be filed at once. The new club expects to hold a big aviation meet next Fall.

## WILL HAVE AERONAUTIC MOVING PICTURES

BALTIMORE, Dec. 19—Moving picture proprietors have become interested in the movement of the Aero Club of Baltimore to have the next international meet on a site somewhere between Baltimore and Washington. These gentlemen got together and made a subscription of $1400 toward the $50,000 fund.

# Roads Building News From All Over The Country

### MASSACHUSETTS' LOSS IS CALIFORNIA'S GAIN

BOSTON, Dec. 20—The cause of good roads in Massachusetts loses one of its ablest advocates in the resignation, announced to-day of Austin B. Fletcher, secretary of the Massachusetts Highway Commission since its organization sixteen years ago. But Massachusetts' loss is to be another State's gain, for Mr. Fletcher is leaving here to take charge of road building on a very large scale in Southern California. He will have full charge of the construction of 400 miles of high-class roads, which is half as much mileage as there is in this State, and to begin the work he has available an appropriation of $1,500,000. Good roads have been advocated in Southern California for some time.

After the appropriation was made, it was determined to obtain the best possible authority to have charge of the work. Mr. Fletcher has a national reputation as an authority on road construction, and he was offered the position together with a most attractive salary. A few weeks ago, he went to California and after investigating the conditions, decided to accept the offer. He will leave Boston about the first of the year.

When the Massachusetts Highway Commission was organized sixteen years ago, Mr. Fletcher became its secretary. The Commission was then a comparatively small affair and was engaged in the construction of samples of improved road for the education of local communities. This work gradually broadened until the Commission has now under its jurisdiction about 800 miles of highway stretching from Massachusetts Bay to the Berkshires, and from the southern to the northern boundaries.

In all this road work, Mr. Fletcher has been a most valuable assistant of the commissioners. A year ago last summer he was one of the delegate from this country to the International Road Congress in Paris. He has often spoken at road conventions in the United States and has written much on the general subject of good roads.

In addition to his connection with the road department of the commission Mr. Fletcher has been prominent in the development of the administration of the automobile law, a duty which has been in charge of the commission since the passage of the first automobile law in 1903. He has been largely in charge of the systems of registration of cars and licensing of operators devised to meet the different requirements imposed from time to time as the law has been changed.

It was largely under his direction that the most recent plan for registering automobiles on a horsepower basis was arranged. He also had direction of the two road censuses taken this summer, which were the most comprehensive ever undertaken in the United States. Mr. Fletcher has also had an important part in the other department of the Highway Commission"s activity, which is the supervision of the telephone and telegraph companies operating in Massachusetts.

### OHIO OBJECTS TO FEES BASED ON HORSEPOWER

COLUMBUS, O., Dec. 20—The announcement that Chairman Ritter of the House of Representatives Finance Committee will present a bill in the next session of the General Assembly providing for an increase in the registration fees for automobiles, based on their horsepower, has aroused a storm of opposition. Automobile owners believe that the present fees are sufficient.

One of the chief arguments against the Ritter bill is the likelihood of its being declared unconstitutional, as the Ohio constitution makes no provision for State licensing. The present fee is classed as a fee for registration only, but it is argued that as it costs no more to register a 60-horsepower car than an electric runabout, a sliding-scale fee would be distinctly a license.

### LIVE PLANS FOR LANCASTER COUNTY

LANCASTER, PA., Dec. 20—As the farmer and the automobilists are steadily getting closer together in road matters, the actions of every progressive automobilist and automobile club are of great interest to our readers. One of the most efficient organized bodies of workers for highway improvements of all the automobile clubs in the United States is the club of the historic old town of Lancaster, Pa. The efforts of this club during the past several years have brought much benefit to the farmers scattered throughout entire Lancaster county. Roads have been improved where previously lethargic road officials permitted them to be neglected. Signboards over Lancaster county have been erected, and the law enforced compelling supervisors to remove loose stones from the roadways. Stubborn and inefficient turnpike companies have been brought to terms and been made to improve the roads over which they exacted toll tribute, and generally better roads have been brought about by the activities of the club.

As the club's good-roads efforts during the past year have been very conspicuous, the management is able to announce that Supervisor John F. Weaver, one of the most practical roadmakers in the country, has accepted an invitation for a practical talk on "Road Making From the Farmers' Standpoint." West Lampeter township, from which he hails, was the first township to accept the club's offer of a King drag last Spring, and was the first township to officially inaugurate this system of dirt road maintenance.

Another guest will be Joseph H. Weeks, president of the Delaware County Automobile Club, who will talk on the newly formed Pennsylvania Good Roads Association, and its efforts to get the Lancaster turnpike repaired between the Gap and Coatesville. A number of Chester county automobile men, Harrisburg Motor Club men and some Philadelphia Automobile Club men have signified their intention of being present.

### KENTUCKY MOTORISTS INTERESTED IN INDIANA ROADS

LOUISVILLE, KY., Dec. 20—Constitutional obstacles to good roads in Kentucky having been removed, that State, at least the motorists of that State, are greatly interested in the efforts for good roads being made in Southern Indiana. The merchants of New Albany, together with the farmers of Floyd County, are taking steps toward the betterment of the roads in that county.

Roads through this section of the Hoosier State lead to the Kentucky and Indiana bridge over which motorists travel to enter Kentucky. Floyd County particularly is far behind other counties in Indiana. The only toll roads in the State now remaining are in this county, all the others being free.

There was a movement on foot some time ago to have the county take over the Paoli and Corydon turnpikes and make them free, but as there is a prospect of the pikes being sold to traction companies for the building of electric lines between New Albany and French Lick, and between New Albany and Corydon, the scheme has been temporarily abandoned.

It has developed that some of the farmers in Floyd and other counties are depending upon a proposed act of Congress to secure good roads, and as this is a visionary scheme, the farmers are urging the County Commissioners to pay more attention to road building and repairs.

An election will be held on December 18 for Road Supervisors in New Albany and other townships in Floyd County and in the Third District. If capable men are selected to fill these positions it is expected that the good-roads movement in Southern Indiana will receive an impetus worthy of the approval of the automobilists.


BOSTON, Dec. 20—On January 1 the new Massachusetts automobile law goes into effect. The law was passed last June, and the first of July four sections took effect. These relate to the equipment of cars, brakes, lights, etc., rules of the road, speed limits, and special speed regulations. On the first of this month certain other sections permitting the Massachusetts Highway Commission that is charged with the administration of the law to prepare blanks and forms for the registration of cars and the reissue of licenses became effective, and under these sections the commission has been issuing registration certificates on a sliding horsepower scale from $5 to $25 and new licenses to be used after the first of January.

**Ten Days for Non-Residents**—The main body of the law, however, goes into effect on the first of the year, and a summary of the more important changes may be useful. The rights and privileges of non-residents have been somewhat enlarged by the new law. Under it a non-resident or his chauffeur may operate in Massachusetts for ten days instead of seven without securing a state registration or license, and if a non-resident desires to operate his car here only during the months of July, August and September he may have it registered at half rates. As heretofore a non-resident convicted of violating the automobile law must secure a state certificate and license. A new distinction is made under the law. Persons previously designated as private operators are under the new statute operators, and chauffeurs include everybody who operates for hire, but manufacturers, agents, dealers and salesmen.

**Half-Rate Registration**—Under the sections relating to registration provision is made for half-rate registration after the first of October in any year and for rebates or increased payment when registering a new car of lesser or greater horsepower than that previously registered. Motor cycles will not have to carry numbers as in the past, but will have small seals affixed to the machines and the registration of a motor cycle carries with it the right to operate without payment of an additional fee. The number of registration plates allowed manufacturers and dealers for their fee of $25 is limited to five with an additional fee of $5 for each additional set of plates. A new requirement relating to number plates is that they must be horizontal and not less than 8 or more than 36 inches from the ground, and the rear plate must be illuminated at night so that it is visible at a distance of 60 feet.

**Age Limit Is Sixteen Years.**—There will be no more driving of motor cars by children for the law sets a limit of 16 years on applicants for operators' licenses and 18 years on applicants for chauffeur's licenses, and a licensed operator accompanied by an unlicensed person at the wheel is made liable for any violation of the law by the person driving.

One of the most striking changes in the law is the cancellation of all the licenses that have been issued in the past six years to private operators and the placing of the license matter upon the same annual basis as registration certificates. There have been issued since 1903 something like 35,000 operator's licenses and until now they have been perpetual. Their renewal costs fifty cents each.

**Penalties More Drastic**—Material alterations are made in the penalties to be imposed for infraction of the new law, and the penalties are more drastic than formerly. Minimum penalties of $10 for a first offense, $25 for a second and $50 for a third are established, the maximum penalties remaining at $25, $50 and $100. The maximum fine for reckless driving, operating while under the influence of intoxicating liquors or so that the lives or safety of the public might be endangered, operating for the purpose of making a record or on a bet, wager or in a race, going away without stopping after an accident and using a motor vehicle without authority, is increased from $100 to $200, and for a second conviction for any of these offenses the penalty is imprisonment from one to two years. Any officer authorized to make arrests may arrest without warrant and keep in custody for not more than 24 hours, unless Sunday intervenes, any person operating without a license or who violates the automobile law. For violations of the speed rules the offender is permitted to put up $100 cash in lieu of a bail bond. The municipal police are required to report to the Highway Commission all accidents which cause, or seem likely to result in death.

**Scale of Fees**—The new scale of registration and license fees is as follows: Motor cycles, including right to operate, $2; commercial motor vehicles, $5; automobiles less than 20 h. p., $5; 20 h.p. and less than 30 h.p., $10; 30 h.p. and less than 40 h.p., $15; 40 h.p. and less than 50 h.p., $20; 50 h.p. and above, $25; manufacturers and dealers $25 for five cars and $5 for each additional car; manufacturers and dealers in motor cycles for ten machines, $10; non-resident registration in July, August and September and all registrations after October 1st, half rates; substitution of registration of an automobile for that of a vehicle previously registered, $2, and payment for increased horsepower; substitution of registration of a motor cycle for that of a motor cycle previously registered, $1; original operator's or chauffeur's license, $2; renewal, 50 cents; examination of operators and chauffeurs, $2; additional copies of certificate of registration or license, 50 cents; additional number plates, 75 cents.

Under the new law not only the fees received for registration and licensing, but all fines imposed by the courts for infraction of the automobile law will go to the State treasury and must be used for the maintenance of the state highways.

One absolutely certain result of this diversion of the money received will be to improve the roads with the fees paid by their users for that specific purpose, which is but logical and right.

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### LEGAL BREVITIES OF INTEREST TO AUTOISTS

**In Washington, D. C.,** a new police regulation prohibiting owners of automobiles from allowing their machines to give out smoke and fumes in the streets has been drafted, because Judge Mullowny ruled that the old regulation was invalid since it discriminated in favor of certain streets. The matter arose over the arrest of a local automobilist charged with violating the smoke regulation. His counsel argued that the regulation was discriminatory and unlawful in that it applied to only certain of the downtown streets. The case was dismissed and a new regulation covering the emission of smoke and fumes from automobiles throughout the city has been drafted.

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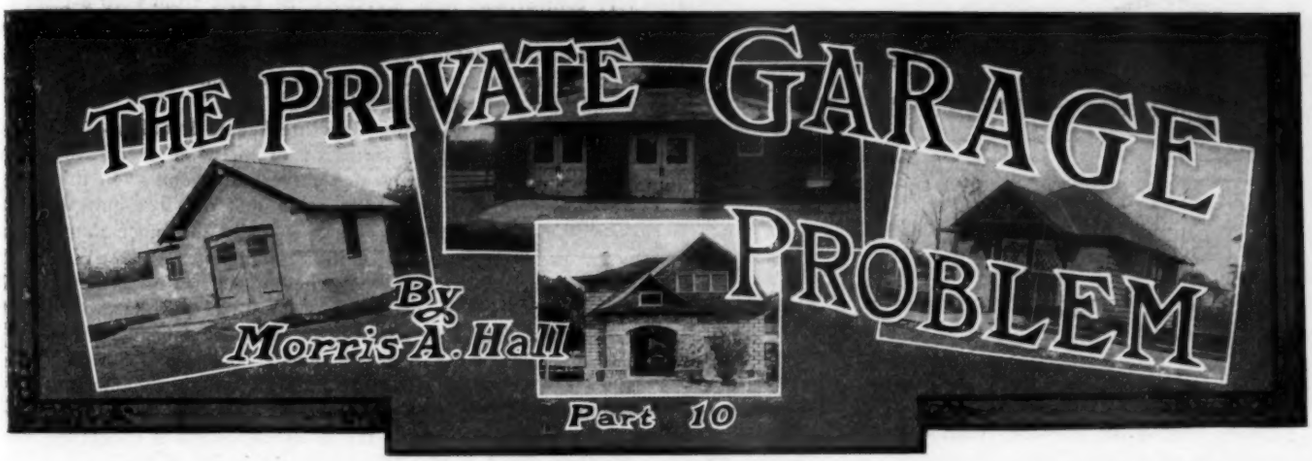
**A wealthy Camden, N. J., builder,** Patrick J. Farley, was severely punished last week for repeatedly violating that section of the New Jersey automobile law which prohibits the licensing of drivers under 16 years of age. To save the hire of a chauffeur, it is said, Farley allowed his 14-year-old son, Clair, to drive his big six-cylinder car even after numerous warnings, and last Thursday Motor Vehicle Commissioner Smith not only revoked his 1909 registration and license, but gave orders that no credentials be issued to him for 1910.



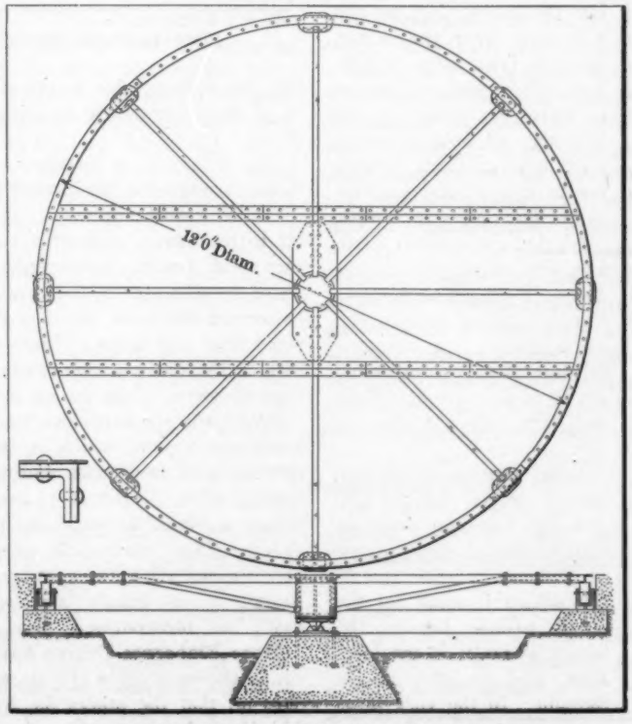

A Group of Small and Medium-Sized Garages, of Various Forms of Construction, Which Show Intelligent Design

EQUIPMENT plays a very important part in the small garage; first, because it influences the size and planning of the whole building, and second, because of its influence upon the cost of upkeep. Thus, paradoxical as it may sound, if he could afford a complete equipment so as to do all of his own repairing and adjusting, every man, no matter how poor, could afford to own and run an automobile. That is to say, if he were in a position to keep repair and upkeep charges down to an absolute minimum, the expense of running would be trifling. The fuel economy of the modern small car has by thought and improvement in design been reduced to a very small quantity, and it is no trick at all now-a-days to make and average 25 miles per gallon of gasoline.

All this brings out the relative and far-reaching importance of proper equipment, which will, for this reason, be the subject of this week's paper. Many small devices which are useful, to say nothing about economical, will be described and illustrated. Some of these small helps are such that any handy man can make them.

**Great Importance of a Turntable**—Many a man provides in his design space for maneuvering the car around, either inside or outside, or both, when the same result might be attained in a much simpler manner, and doubtless with a far less expense, by the use of a turntable. This may be as small as the length of the wheelbase, plus a very small margin to allow for the width of the car and some clearance. Actually the smallest diameter which may be used is the hypothenuse of a triangle, of which the tread forms one side and the wheelbase the other. When this has been figured for any given car, a small amount should be added as above for clearance. Figured out on this basis, a 10-ft. turntable will give nearly 6-in. clearance for a 100-in. wheelbase car.

With the turntable, the car need not be maneuvered at all, it can be driven right in onto the centrally located and circular turntable, which is then revolved to bring the car to the position desired, or to point it in the direction in which it is desired to leave. Of course, it is not a substitute for a pit, but having a turntable in the center of the floor does not cut into the available floor space as does a pit, so that instead of a subtracting factor it becomes an additive quantity, in that floor space is saved or gained instead of lost.



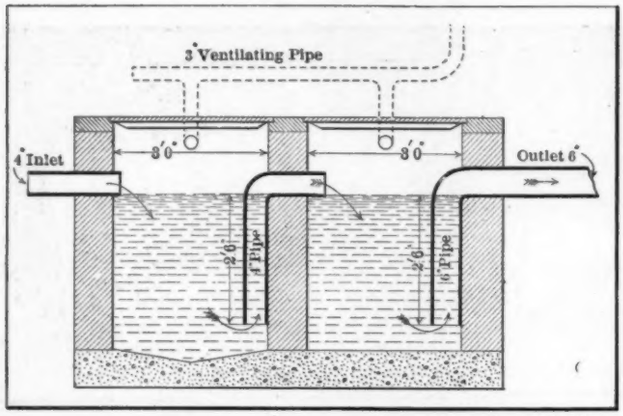

Sectional Drawings of Medium-Sized Turntable

To the little fellow, building his first garage, and that, too, a very small one, the item of size is a very important one, and any hint that will help to reduce this size, and of course with it the total cost, is eagerly grasped. To this man the turntable is a godsend, for it may take up the whole central part of the floor, the expense of which may then be practically neglected, since it is included in the cost of the turntable. While the latter are not given away by any means, the price, considering that the whole center of the floor is included, is not so very high.

In the case of the larger garage, too, the saving effected is such a large one as to be worth considering, say for a two-car garage. In this case, the extra space for maneuvering the two cars may amount to as much as 50 per cent. additional area, that is the equivalent of the space taken up by one car. Bearing in mind that this additive quantity is not added alone to the floor, but to all four sides, the ceiling if any, the four sides of the roof, to the foundations, to the fireproofing, to the painting, to the depreciation and upkeep, and some idea of the importance of proportioning the ground area closely to that actually required by the cars owned may be obtained.

For the very large garage, on the other hand, the garage for three or more cars, the expense is of less weight, but the turntable will be found in these buildings for the convenience of shifting cars around. From all of which it would appear as if it was somewhat of a necessity, a place for it having been found in the small, the medium-sized and the very large garage.

Elsewhere on this page will be found a drawing showing a cross-section through one of the turntables now on the market, this being constructed from structural iron, in such a manner as to possess not alone strength, but a minimum of weight. While the size shown is 12 ft. in diameter, smaller and larger sizes are made to suit any sized car. However, the car which would call for a larger size than this, would be an unusual one, since this will take a car with 132-in. wheel-




Courtesy of "Motor"

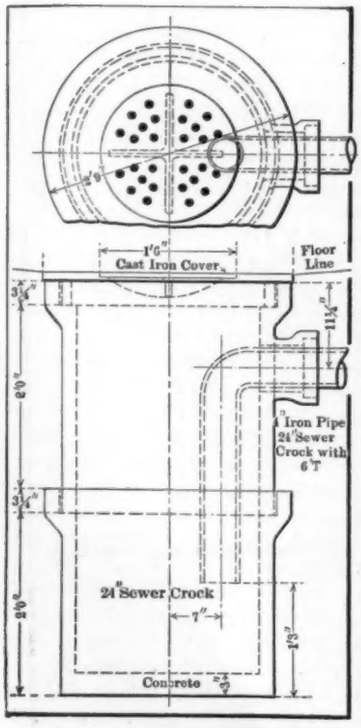
**Two-Compartment Oil Trap Built of Concrete**

base. Of the cars listed last year at show time in THE AUTOMOBILE special show numbers, numbering about 1,000 in all, just eight exceeded this figure.

In detail, a box girder forms the central part or hub and carries the central pivot upon which it is supported in part and upon which it turns. From this central member eight structural iron arms radiate to the rim, which is a heavy section channel open side out, bent to the desired radius. The lower surface of the latter runs or rolls upon a series of eight rollers set into the foundations and equidistantly spaced. Across the middle are set two stiffeners, which aid in keeping the shape and level of the whole structure when supporting heavy loads. The top or floor surface is of light sheet steel riveted to the members below, while the lower side is left open.

To install one of these in a garage, all that is necessary is the central foundation of cement and the circular ring, built up to such a level as to bring the rollers into correct contact with the underside of the rim channel.

**Proper Drains of Great Importance**—In the construction period one thing that must be taken seriously is the matter of drainage. It is practically impossible to avoid spilling both oil and gasoline on the floor. With the continuous washing going on the water will wash both into the drain and thence into the sewer. Neither one will mix with the water, but will float upon its surface ready and willing, as it were to ignite at the first sign of heat or flame. Such heat or flame, setting fire to this oil and gasoline in the drain pipes or sewers, may do incalculable damage, not necessarily to the garage from which it came. For this latter reason, and as a matter of common fairness, every owner should see to it that his drains do not carry off any fuel or oil.

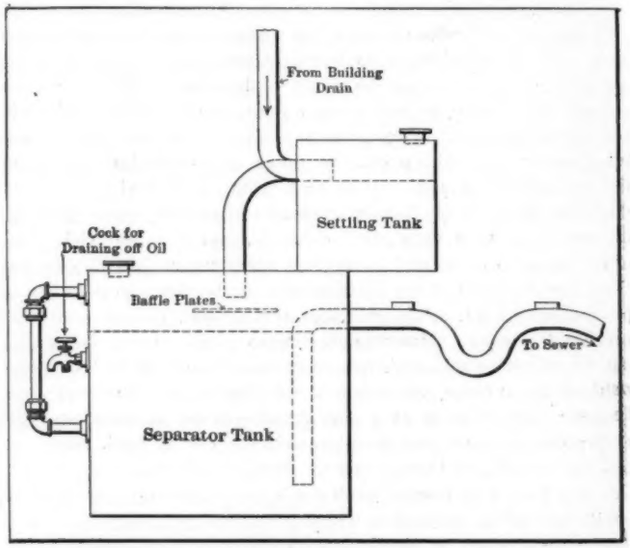



**Sewer Trap Tile and Iron Pipe**

From another standpoint, this is waste, for the oil and gasoline may both be recovered, and money saved in that way. Of course, this saving is small for the small garage, but in the larger places it is considerable and worth some thought. In the very large public garages it becomes a very considerable item, moreover the waste from such a place is great enough, were it not properly attended to, to endanger the safety of many large business houses using the same sewer. So much is this the case that nearly all large municipalities recognize it and have stringent regulations relative to it.

**Many Ways of Solving Gasoline Waste Problem**—This has evolved some approved forms of drain, while there are many others of private design which are equally good. On this page are shown three of these, one being the form recommended by the City of Milwaukee. This is actually the most simple and by far the least expensive of the three given.

It consists of two 24-in. sewer tiles, one with a 6-in. tee and the other plain. The plain one is set down into the ground and the bottom filled with concrete to a depth of about 3 in. Into the tee is inserted a bent-iron pipe of 4 in. nominal size, this being bent at a right angle, and the inner end reaching down to within one foot of the bottom. The outer end of the iron pipe leads to the sewer, and as far as its usefulness is concerned, the opening around it, that is between the inside of the tee and the outside of the iron pipe, may be cemented also. To cover the top, a cast-iron cover is made which fits down into the lip of the tile, has a removable center with many holes bored into it, and is of itself removable to allow full access to the inside of the drain.




**More Elaborate Scheme of Separator to Save Oil**

The action is as follows: Water carrying oil and gasoline flows through the perforated cover into the drain, which must fill up to a depth of over 3 ft. 5 in. before any thing will flow off to the sewer. Before this depth will have been reached, in fact at all depths, the oil and gasoline will float to the top. The lesser specific gravity thus prevents either one from going to the bottom of the drain, which is the only place from which the outward flow can begin. Thus, the gasoline and oil must always stay in the drain. The former will evaporate through the perforated cover, while the oil will have to be removed.

Practically the same description of action applies to the other small one shown, which is, however, built of concrete in two sections with bent pipes uniting the first and second, as well as leading from the second to the sewer. The double compartment simply serves as an additional precaution, both chambers working exactly alike. Removable covers allow of access to both, while perforations allow the gasoline fumes to escape as before. This design is so simple and so easy to make that it might easily be incorporated into any private garage building.

**More Elaborate Design Saves the Costly Fuel**—In the third cut is shown a more elaborate design of a trap which not only does all that the others do, but saves the fuel and oil as well. This form has two tanks, the latter one acting as the separator

tank, and carrying a drain cock at the side and near the top, by means of which the floating oil and fuel are drained off at regular intervals. After draining off, another form of apparatus is used to separate the two, but the difference in specific gravity is such as to make this easy of solution, simple settling basins effecting the desired result without any attention.

Speaking of gasoline saving, the whole fuel question is worthy of attention. Thus everyone should have an outside tank for keeping the fuel, but not all can afford the complete apparatus as now put on the market. To attain the same results with a lessened expenditure, the sketch below shows the construction to resort to. There is but one thing necessary other than the tank itself, and that is a source of air pressure, and, of course, connecting pipes to transfer it to the tank outside, and to carry the fuel back to the garage.

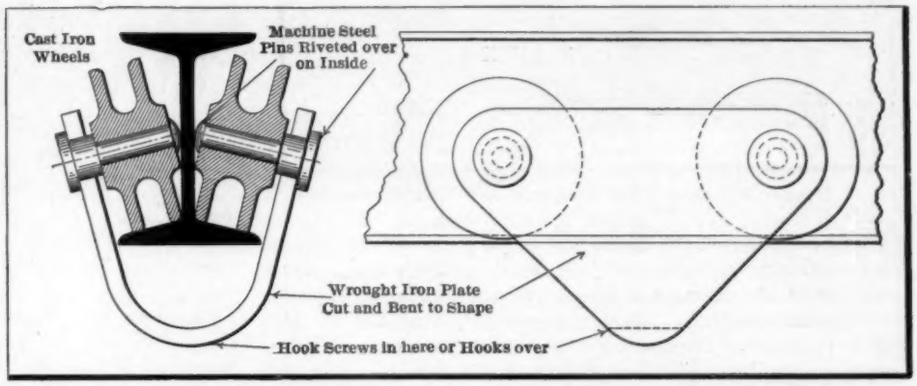
As shown, a bicycle or other foot pump A is provided within the garage, this being connected with one end of a pipe to the tank, marked air line B. This leads into the top of the buried tank C, and the pressure of the air within the tank forces the fuel through the other pipe, marked gasoline line D, back to the supply pipe at E. By locating the filling cap F outside, the supply may be renewed at will and without entering the garage.

To use the fuel, all that is necessary to do is to open the cock at E and the one down at the floor. Then pump at the foot pump until the liquid flows at E. By turning off both cocks the pressure may be retained in the tank for some time, so that but a few strokes of the pump are necessary at any one time.

**Moderate First Cost Biggest Advantage**—Aside from the cost of an air-tight tank, a practical necessity anyhow, the other costs of this piece of apparatus are negligible, consisting only of the two lines of small-sized pipe, soldered into the tank, the two cocks and the foot pump. This would total up very small, so small as to bring the outfit within the means of everyone.

At the top of this page is shown a suggestion to the amateur garage builder, and one that will save him much labor. This is a suggestion in the way of providing for hoisting apparatus while building. If an I-beam, or a pair of channels set back to back, or even an old tee-rail, is set across the building when the latter is going up, it will never be in the way and will always be there for the future. This should be set across the garage in such a way as to be along the center axis of the car, and directly above the center line. In placing it thus as will be shown later, when the block and tackle or other hoisting apparatus is added and it is desired to take out an engine, for instance, the car may set in any old position, while if the beam is set across the length of the car the latter will have to be moved back and forth until the center of the engine weight comes directly under the center of the beam above.

This beam need not cost much of anything, in fact, in many cases, a discarded tee-head rail may be obtained for nothing, and the carting charges will be the sum total of the cost. With the beam in place, when the owner makes up his mind to add the hoist, he has but to put on some form of a traveler to which the hoist may be attached. The sketch suggests one. This is made of a pair of cheap cast wheels, of almost any metal, cast iron being satisfactory. These run on the sloping part of the I-beam, channels, or tee rail, all of which have approximately the same slope, and consequently need some form of uniting piece, which will take the slope into account as well as providing a place for the hoist to hook or screw on, these being the usual methods.




Suggestion in the Way of Provision for Hoist, and Traveler for Same, Using I-Beam

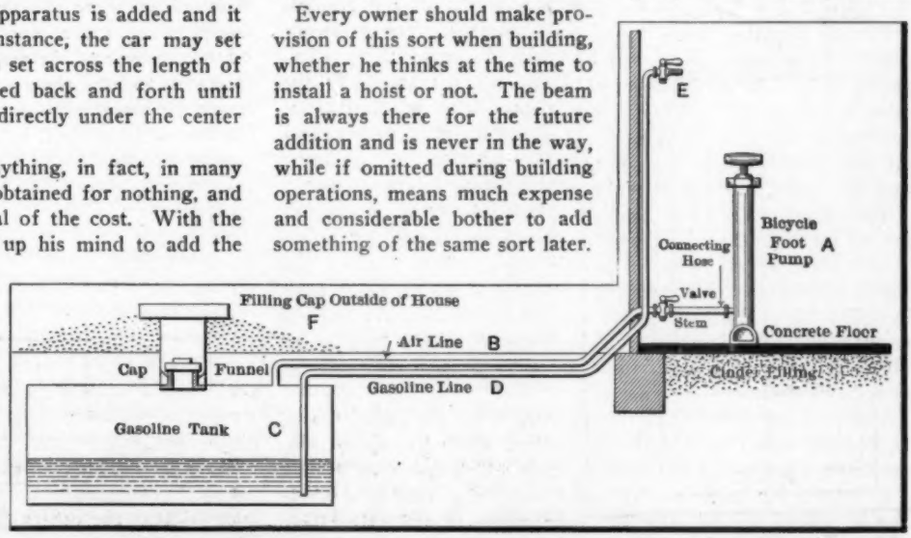
In the sketch this is shown as a wrought-iron plate cut to shape and bent around nearly double so as to present a comparatively narrow base for the hook or screw. In side elevation, the finished and folded plate presents a triangular shape.

Pins of a shape to hold the wheels to the plate are used at the four corners, two on each side, where the wheels are pivoted. The pins are of machine steel, made of good diameter to present a large bearing surface, and with a large head. The inner end may be riveted over to hold the wheel in place on that side. Wheels can just as well be solid, but are shown with a central circular groove so as to reduce weight.

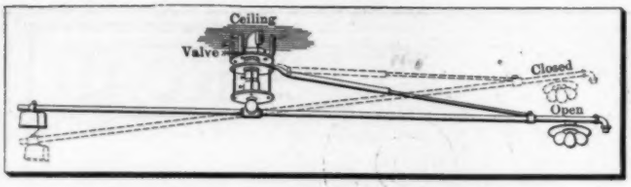
For the hoist, a duplex or triplex chain hoist will answer the purpose very well, and will lift far in excess of the weight of the entire car. For the sake of economy, however, a block and tackle using rope could be utilized to just as good purpose, with the single proviso of requiring a fastening at the traveler more substantial than rope.

By making the distance between the wheels on the side long, the little carriage will run along the beam very easily, and may be slid along to the point at which it is desired to use the outfit, in the usual case at the front end of the car. This form of apparatus does away with jacks and their slow and awkward use, in that it is much easier and far better to slip the hook under the offending part, give a couple of pulls to the rope and there you are. In such a case as removing a rear axle, wheel, or tire, this method allows of hoisting the entire rear end of the car as a unit, so that one or both wheels may be worked upon at one operation. The chain blocks mentioned are self locking, and the block and fall is also supposed to be, but unless many turns of rope are used, practically is not. This is simply a matter of tying the loose end to some convenient post, or a nearby hook.

Every owner should make provision of this sort when building, whether he thinks at the time to install a hoist or not. The beam is always there for the future addition and is never in the way, while if omitted during building operations, means much expense and considerable bother to add something of the same sort later.




Suggestion for Home-Made Gasoline Supply System with Tank Buried Outside



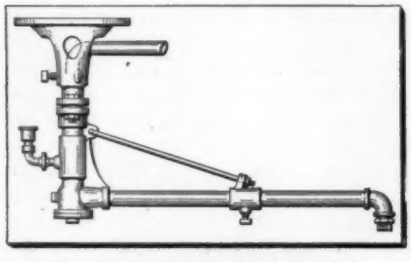

Overhead Washer with Weighted Arm and Cutoff

**Another Home-Made Substitute for a Jack**—While this is more than a substitute for a jack, handling loads that a jack could not be used upon, as well as working in a different manner, still it would supplant a jack. Another handy substitute for the latter is shown at the bottom of this page, and consists of a simple wooden lever of the first class, that is, with the pivot between the weight to be lifted and the force to lift it.

As shown, it is made of wood, but this need not be adhered to, as metal is equally good and stronger, but, on the other hand, heavier. A so-called sandwich beam would be very good for this purpose, but is objectionable on the score of expense. This consists of a thin plate of metal between two comparatively thin pieces of wood. The wood may be used thinner than otherwise on account of the sheet metal.

This one has a single central piece of wood, preferably of a tough wood, with a smaller rubbing or base piece hinged or hung on one end. To lift anything with it, the low end is hooked under the article, and then by resting the rubbing piece on the floor and pressing down on the long handle, the article is lifted. The dimensions given are only suggestions, and the outfit may be made to any desired figures to fit the individual case.

This is similar to the lift used for changing tires on a racing car, with the exception that the latter has two branches connected, so as to form a rectangle in the plan view. This is stuck under either the back or front axle, and by pulling down on the extended rear arms the whole front or rear end of the car, as the case may be, is lifted free of the ground. To make one of the latter from the drawing shown, simply connect the two long arms and the two rubbing pieces, so as to be at the same distance apart. If desired, the two hooked ends may also be connected and at the same distance apart as the others, but this is not necessary to the successful use of the device.



Overhead Washer Not Weighted

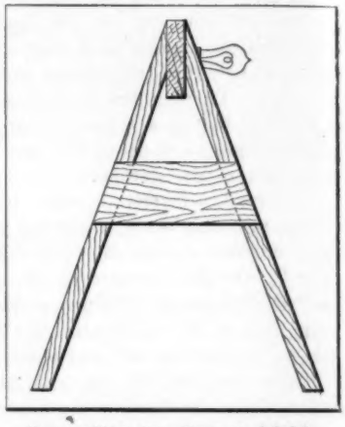
**Proper Lighting Very Important**—One of the little things which the amateur repairman cannot do without is light and plenty of it. The arrangement of the garage and windows in the same is not always such as to afford this, or it may be that the position of the man when working at the car is such as to shut off the light from the biggest and best window. In cases like this, and when working at night artificial light is a necessity.

For garage use electric light should be used if at all possible, for all other means of lighting introduce an element of danger in that there is and must be an open flame. With gasoline and highly inflammable oils always present this is the height of folly. In laying out the lighting system it is impracticable to try and suit every need, so all lamps should be hung with very long cords. This will allow of moving them around the garage to suit the work being done.

A good thing to have for this purpose is a light stand, one of metal being now placed upon the market, which has many commendatble features. The cross-bar upon which the lamp is hung is adjustable for height and direction, while the stand as a whole may be moved around at will. Many prefer to make their own light stands, thus saving the price of the metal ones. For these a suggestion is given. It is this: to the saw horse, without which a garage would be incomplete, attach a lamp socket in such a way as to allow of the insertion of the lamp on one side and of the socket for the light plug on the other. In nine cases out of ten when working on dissembled parts you will have them supported on saw horses.

Then all you need to do, to have light, is to screw the lamp plug into the one side of the fixture on the horse and the lamp into the other. The lamp should be removable, as it is very liable to be broken otherwise, since horses are treated roughly, while the extension and plug should be removable so as not to tie up any one light.

**Facilities For Washing Needful and Economical**—While nearly everyone will grant that adequate washing facilities are needful, or desirable, few would figure out that they are also economical. This is nevertheless true, for with improved and handy means for washing, the car will be washed more regularly, more promptly and more thoroughly. This applies not alone to the painted parts of the body, but to many of the mechanical parts as well. To cite an excellent example (not a mechanical part, however), the wheels can not be washed too much, particularly in warm weather.

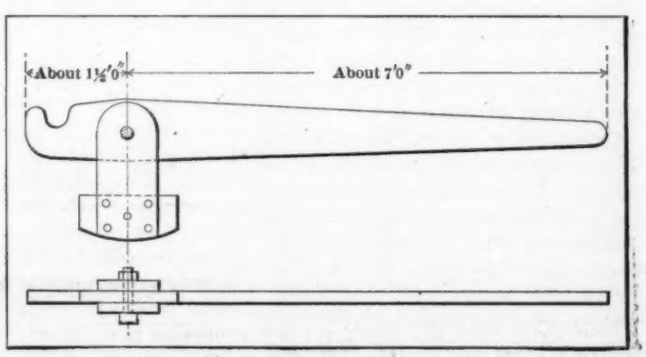


Suggestion for Garage Light

Heat opens the joints in the wheels, while plenty of water will cause the wood to swell, thus closing the cracks. This applies to the miter as well as the felloe, to say nothing of the tenons, spokes into felloe.

Granting, then, the need and usefulness of a form of washing apparatus, the question arises which? The overhead washer, two of which are pictured on this page, presents some ideas which cannot be obtained in any other way, and are desirable. This form is always up out of the way, when not wanted, and aided by the hinged joint, may be pulled down for use. The one shown first is weighted so as to balance itself in any position in which it is placed.

In the second one the construction is such as to suggest the making of a washer-using water pipe, obtainable at any plumbing shop. The only problem would be the swivel joint at the pivot point, but the plumber could doubtless furnish a full universal swivel which could be used for this purpose. In that case, making one of these is simply a question of knack with a stilson wrench and other pipe-fitting tools. The corner would be a simple elbow and the angle brace a pair of tees, with the tee end plugged, and the plugs drilled for the wire cable. This, in turn, could be made with turnbuckle in the middle, so as not only to tighten it up at first, but to allow of later tightening, as opportunity presented or as it was found to be needed.




Sketch of Home-Made Substitute for Jack

# ONE MAN'S EXPERIENCE ON THE ROAD

By James S. Madison

EVERY new owner and every prospective owner of a motor vehicle ought to realize that there is a strong probability of having an accident on the road sooner or later. It can be mathematically demonstrated that out of 1,000 cars, each making a mileage of 5,000 in a season, a certain, definite number (which is entirely too large) will meet with one or more accidents that will be more or less disastrous, depending upon the special circumstances in each case.

Many owners, before their first ride, have firmly resolved that there will be no accidents, or if one should occur, that it will be the other fellow's fault. This, of course, is right and proper; yet in spite of good intentions and good resolutions, many avoidable accidents, not due to the other fellow, do happen every day.

Further, every owner and every prospective owner should realize that while there is only a probability of accident, there is a certainty that the car will some time stop on the road, or certain contingencies will arise which will render it necessary to stop the car to prevent injury being done the engine, chassis, body, or tires. It is inevitable, inescapable, that something will go wrong sometime, causing a longer or shorter delay, depending upon the seriousness of the cause, the ability of the driver to locate it, and his skill in remedying it when found.

This article is written with the expectation that it will be something of a guide to new owners in aiding them to prevent certain kinds of accidents, and to somewhat shorten the delays which are sure to come to them on the road. The writer has owned a gasoline car for nineteen months—578 days. Of this time the car has been on the road 480 actual days, winter and summer.

At no period (with the one exception of fourteen days required for re-varnishing) has it been laid up for repairs more than several hours at any one time. The reason it was not on the road on the remaining 84 days was due to disinclination of the driver or the unpleasant condition of weather or the roads, and not because the car was out of commission.

While this is not an exceptional record, it is a satisfactory one and is largely due to two factors: First, the sturdiness of the car itself; second, the driver's early experiences taught him to be more or less cautious, so that by far the greater portion of the driving has been done without taking risks, and further because he was willing to give the car a daily inspection, with a very thorough one at least once a week.

**First Collision**—The owner had driven the car (with the aid of a chauffeur) about 30 miles on his first run. The greater portion of it was in the country where the driving was so easy as to give a false feeling of confidence. On returning to town, it was necessary to go through a crowded street. The point where the congestion of traffic was greatest was up a short grade leading to a bridge narrower than the street.

Everything had gone serenely up to this point. The owner found himself in a procession of vehicles, hemmed in on one side by another procession going in the opposite direction, and on the other by the railing of the bridge. He was going at about six miles per hour with the highest gear engaged, spark retarded, throttle closed as far as possible, foot on service brake. Suddenly the tail-board of the wagon ahead seemed uncomfortably near. He made an effort to stop the car by pushing hard on the service brake.

This was not sufficient, and before it was possible to get on the emergency brake (side-lever), the impact came, resulting in the destruction of two gas lamps. This was caused by two errors on the part of the driver. It was an error of judgment to attempt to take the car through the crowded streets on his first ride. Then, he should have disengaged the clutch. The damage was not great, but the occurrence was annoying. Since then he makes it an invariable rule to throw out the clutch when in doubt. If a beginner will learn to throw out the clutch whenever there is any question in his mind as to what is going to happen, he will save many an unpleasant experience.

**Second Collision**—The car was passing another on a country road. On inquiring of the other driver the distance to a certain town he told me I was going in the wrong direction. I slowed up, turned around, and as he had stopped along the left-hand side of the road, I ran along at a 15-18-mile clip until I came within a short distance of him, when I threw out the clutch and ran alongside in the middle of the road in order to get some further information.

Just as the car stopped, it was hit behind by another car going in the same direction, which had come up in the rear unknown to me. In this case, my only neglect was not to have raised my arm as a signal that I was about to stop. The mistake the other driver made was to have run so close to me without being prepared to make a sudden stop. The damage was not serious to either car, but this was due to good luck rather than good management. Had the conditions been only slightly different, the results might easily have been disastrous.

**Hurry Call for a Pair of Horses**—The car had been going along nicely for about an hour, when it was noticed that at longer or shorter intervals the engine lost power suddenly for a fraction of a minute at one time, or for a longer period at another. After limping along for a short space, the car would just as suddenly regain its normal speed. It acted very much as if there had been a sudden gentle and repeated application of the brakes. The brake and transmission bands were examined to discover if any of them were dragging.

Nothing was found. On starting again, the first turn of the crank brought the necessary explosion and the car ran along very well until half way up an 18 per cent grade, when it stopped without warning or symptoms. We could not start the engine again and there was no spark at the timer or coil (non-vibrating). The battery cells on being tested showed 18 amperes. The battery and other connections, primary and secondary wires, were examined without discovering anything. The first motorist who came along courteously offered assistance.

After spending at least half an hour, he decided the coil was burnt out. Being seventeen miles from the nearest garage, and not eager to accept the first diagnosis, since, if correct, it would necessitate a pretty severe operation, we waited for the next tourist. He was also obliging enough to give us about twenty minutes of his time. He concluded it was a burnt-out coil. Since the afternoon was young and the June air balmy, it was decided to hold up several more autoists.

Four others came along at intervals and were interviewed, but I was unwise enough to tell each one of them that the preceding ones had decided that the trouble was with the coil. They all agreed that this was it. There was nothing to do but to go across the fields after a farmer, who arrived with two horses about an hour later and towed us to the nearest village, where we spent the night.

Before turning in, a telegram was sent to the garage man describing the difficulty and asking him to bring a new coil

early in the morning. He arrived about nine o'clock and his first statement was to the effect that he had been in the business for ten years and had never seen or heard of a coil of that particular make being burnt out or breaking down from other causes; and further, that before he looked at the coil he would go over the whole engine.

Without asking any questions, he examined the timer and found, as I had, that there was no spark. Next he tested the batteries and declared them all right, and then announced that there was a broken connection somewhere. He found it in about three minutes, but a novice might have looked for it a whole day without discovering it, because it was most effectively concealed in the switchboard which extended through the dash. The portion nearest the driver consisted of a hard red rubber circular plate containing two round holes for the plug to make connection with battery A or battery B as might be desired.

This plate was fastened to the dash by three screws. To the other side of the plate, which was not visible, there was fastened, also by screws, a hard rubber cylinder about 1 inch in diameter and 1 1-2 inches long, perforated lengthwise by two brass tubes, 1 1-2 inches long, for the introduction of the round switch plug. The top of the rubber cylinder (the end nearest the plate) was covered with a circular brass plate, to which the two brass tubes were attached.

Fastened to this circular plate and running along the side of the cylinder was a strip of brass 1 3-4 inches long and 1-2 inch wide. It had been secured to the brass plate by solder and to the rubber cylinder by a screw. To the lower end of this strip was attached the wire which led from the switch to the coil. The whole trouble was caused by the soldered joint between the strip of brass and the circular piece of brass working loose.

In spite of the fact that the strip was secured by a screw, the vibration of the car (or something else) had caused it to separate sufficiently from the plate to create an almost invisible crack across which the current did not pass. So since the connection to the coil was broken, there was no current passing to it or through it.

While I was greatly chagrinned to find out how simple the fault really was, the lesson that I learned was that I must study the whole car more thoroughly, so that I need never be obliged to depend upon the opinion of the chance passer-by. This I did within three days, taking apart certain portions that were ordinarily out of sight. The information gained was worth more than the trouble involved. I have not been held up since, nor do I expect to be, without being able to determine the cause.

On the occasion above referred to there were seven automobilists who could not distinguish between a broken connection and a broken-down coil. There must be many others.

**Irregular Explosions**—On one occasion, after running forty miles, the engine began to miss. There was an easily-perceptible interruption of the rhythm of the explosions, though the car was kept going until several sharp cracking explosions were heard, evidently in the muffler. Upon stopping and looking for the cause, it was discovered to be a loose connection between two cells of the battery. One of the small brass thumb screws had worked loose and dropped off, leaving the wire attached to the zinc terminal to move about with the motion of the car, thus causing temporary and repeated breaks in the primary circuit.

Another case of missed explosions occurred the next day. The symptoms were the same and naturally I expected to find the same cause. But after going over all the battery, coil, and timer connections, I found everything right with a good spark at the timer. I therefore knew that the difficulty lay somewhere in the secondary circuit—the coil and its connections leading to the spark plugs. With my previous experience in mind, I concluded to let the coil alone and inspect the spark plugs. I soon discovered a very minute crack in one of the porcelains through which the current escaped forming a short circuit and thus preventing firing of the charge in the cylinder.

Perhaps the most common cause of missed explosions is weak batteries. The following experience has happened a number of times and is typical. The car was going up a hill when a single miss occurred. Just before reaching the top, about a quarter of a mile further on, another one was noticed. The distance from this point home was about five miles of level road.

There were no more misses. The next day they occurred again. The engine missed fire eight times, the next day the number increased, and on the fourth day, on the last 1 1-2 mile of a run, they came so often as to render it somewhat difficult to get home. I knew all along what the trouble was—weak batteries—but I wanted to run them down. When they were tested, three of the eight cells showed 0 amperes, and none of them showed above 2.

There are other causes for missed explosions, but the three just referred to will cover the greater portion of all that occur.

**Engine Stopped Suddenly**—The car had been running about an hour when without any preliminary warning or suggestion of trouble the engine stopped firing. I knew at once that it was due either to no gasoline in the tank, or that the fault lay in the ignition system. A glance into the tank showed a good supply of fuel. On cranking the engine there was no explosion.

Next I found there was no spark at the timer. I then began to examine the battery for a broken connection. I found a broken wire and it was a matter of two minutes to cut away the rubber insulation from each end for about an inch, bend the protruding wires in the form of a U, hook them together, twist them with a pair of pliers, and wrap the joint thus made with electric tape. This ended the difficulty.

**Trouble with the Carbureter**—For five days the car ran sluggishly on hills. The engine acted as if it had lost about half its power. It stopped several times, in each case on a hill, and I could only get it to go after fussing about it for fifteen to twenty minutes. I thought the trouble might be due to some unknown chemical action in the interior of the battery cells, which prevented a full current being delivered when a heavy demand was made upon it—in going up hills, for instance.

I was led to adopt this view of the matter largely because the engine could be started after it had remained idle for some time, thus apparently giving the battery time to recuperate, if the trouble were there. I put in eight new cells, but on the first hill I tried the same thing occurred. I then began experimenting with the spark and throttle levers—the car standing still, the engine running. With the throttle almost closed and the spark advanced, the results were satisfactory.

Just as soon as I opened the throttle wider, however, the engine began to slow down and finally stopped. This was clear evidence that the gasoline was not flowing properly. The carbureter was then removed and carefully inspected, and the cause of all the trouble soon found. A grain of sand about half the size of an ordinary pinhead was lodged in the tube closed by the needle valve. The grain was just small enough to permit sufficient gasoline to pass to keep the car going on level stretches, and large enough to prevent a sufficient quantity from passing when the engine needed a larger supply on the hills.

That grain of sand cost me $3, and it got into the tank through the carelessness of a garage boy who, when he filled the tank, placed the screw-cap bottom downwards on the top of the tank, where there is always an accumulation of sand and dirt, and then replaced it without wiping it off. Since then, whenever the screw-cap is removed from the tank, it is placed bottom upwards on the adjoining seat.

**Loss of Power**—When the engine was cranked in the morning it started off more slowly than usual, and uncertainly. After the car was started I found it necessary to advance the spark and open the throttle wide in order to get a speed of 10 miles per hour. This did not last long, as the engine stopped, and on cranking, refused to go. My first thought was that the compression was faulty, but this, on trial, was found to be excellent.

Once more I turned to the battery box, which also housed the

coil. The only thing I could find disturbed was a piece of ordinary black oilcloth that had fallen from the top of the box across two brass thumb screws of the coil. The shining surface of the cloth was partially short-circuiting the coil, thus preventing a portion of the current from reaching its proper destination. An acquaintance had a similar experience, except that the disturbing cause was a bouquet of flowers which fell across the two coil terminals.

**Loss of Compression**—I have had but one case of lost compression. On cranking the engine, the handle moved so easily as to show at once that there was no compression in one cylinder. I first examined the inlet valve springs, and then the valves themselves. Next the gaskets, then the spark plugs. Everything was right. On inspecting the exhaust valves, one was found to be loose, and upon tightening it with a wrench the trouble vanished.

**Difficulty in Starting**—One day twenty minutes were spent in getting the engine started. There was plenty of spark and gasoline, but the explosions would not come. Finally, after giving the starting handle a strenuous pull, the engine started. The car was run thirty miles without a single miss. I then stopped for luncheon, and upon attempting to start again, the same difficulty was encountered. For two days this state of affairs existed. I went over the entire ignition system, batteries, coil, switch, spark plugs, timer, and all wires; the carbureter was removed and thoroughly cleaned; all the valves, gaskets, joints, intake tube, etc., were carefully inspected, without any satisfactory result.

After studying the matter it occurred to me that the mechanism controlling the timing of the spark might have shifted. I soon discovered that the position of the timer on the cam-shaft had been changed, owing to the loosening of a set screw, about 1-8 inch, so that the spark was considerably retarded. Upon adjusting the timer, the engine started off on the first turn.

**Ditched at Last**—Going over the sandy roads of New Jersey, not far from Lakewood, I attempted to make a turn. The roadbed, while sandy, was hard and somewhat narrow. In order to make the turn I ran off to one side upon what seemed to be equally hard ground. I was mistaken, for as soon as the right wheel struck it, the sand gave way and the wheel sank about six inches. I attempted to get out by using my own power, but this only made matters worse, so I had to start in on a new line of tactics.

Both right wheels sank deeper until there was only a half inch clearance. I then dug a small furrow in front of each wheel, placed a board from a nearby fence as far under each wheel as I could get it, and started the engine. Upon throwing in the clutch carefully the driving wheels spun round, but the car did not budge an inch. Afraid of injuring the tires, I gave it up and sent a small boy to the nearest garage, about a quarter of a mile away, for help. In a short time I was back on the road by the aid of the garage car and a rope.

**Two Sets of Tires**—The car has had two sets of tires of the q.d. type. The first set was defective, and, in addition, too small for the weight of the car; consequently, they wore rapidly and gave a mileage of only 2,400. The second set was larger by a half inch in diameter and a half inch in cross section. At this time they have given 3,400 miles and appear to be good for two or three thousand more. In all this distance travelled, 5,800 miles, there has been no tire trouble of any description on the road, with the exception of one puncture, a result which may easily be attributed to the careful inspection they receive at short and definite intervals.

Whenever the car is brought in from a trip, I run my hand over the surface of each tire in order to discover any cuts or dig-outs, nails, tacks, etc. Whenever a cut that goes through the rubber to the fabric is found, it is vulcanized immediately, if possible, or in any event, not later than the next day. If a driver will acquire the habit of running his hand over the tires as suggested, he will be surprised at the number of tacks, nails, pins, broken wires, etc., he will find, each of which will usually result in a puncture, sooner or later, if not removed.

# THE AUTOMOBILE CALENDAR

### Shows and Meetings.

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

**Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.**

Jan. 4.....New York City, Automobile Club of America. Annual Meeting, Society of Automobile Engineers.

Jan. 5.....New York City, Waldorf-Astoria Hotel, Annual Meeting Motor and Accessories Manufacturers, Inc.

Jan. 7.....New York City, Manhattan Hotel, General Meeting Manufacturers' Contest Association.

**Jan. 8-15.....New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.**

Jan. 13.....New York City, Engineers' Society Building, Adjourned Meeting, Society of Automobile Engineers.

Jan. 17-22.....Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 17-22.....Kansas City, Mo., Annual Automobile Show of the Motor Car Trade Association of Kansas City. P. S. Sutermeister, Secretary, Midland Building.

Jan. 24-29.....Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Jan. 24-31.....Washington, D. C., Convention Hall, Automobile and Aeronautical Show, Automobile Dealers of Washington. B. R. Johnson, Manager, 1313 New York Avenue, N. W.

**Feb. 5-12.....Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.**

Feb. 14-19.....Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dal H. Lewis, Manager, 760 Main Street.

Feb. 19-26.....Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26.....Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

Feb. 21-26.....Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-27.....Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26.....Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.....Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19.....Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

March 21-30.....Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo, Launch Club. D. H. Lewis, Manager, 760 Main Street.

Mar. 26-Apr. 2....Pittsburg, Pa., Duquesne Garden, Fourth Annual Show, Automobile Dealers of Pittsburg. Frank D. Sauppe, Chairman.

### Races, Hill Climbs, Etc.

Dec. 22-29.....Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

Feb. 4-6.....New Orleans, Annual Mardi Gras Speed Carnival, New Orleans Automobile Club.


## PROJECTED TIRE CHANGE

Editor THE AUTOMOBILE:

[2,124]—Will you kindly give me a little information on the following subject, through "Letters Interesting, Answered and Discussed?" I am contemplating the purchase of an OO 20-horsepower White steamer, but think the wheels are too small, as they use 32-inch by 4-inch tires on the 1910 model. Could I have demountable rims put on and by so doing use larger tires, say 34 by 4? Also, how much power would be lost by this change, that is, if the gearing was not changed. X. X. O. B.
Portland, Mich.

In the Nov. 25 issue of THE AUTOMOBILE, on page 937, we published a table of the sizes of rims which the various styles and diameters of tires call for. From this table it is apparent that your 32 by 4 cylinder tires have rims which are 23 11/16 in. in diameter. Now, on these you may put some one of the following demountables:

| | | | | | |
|---|---|---|---|---|---|
| 34 by 3 1/2 | Fisk demountable | Rim | Size | 23 | 3/16 |
| 34 by 4 1/2 | Firestone | " | " | 23 | 31/32 |
| | Continental | " | " | 23 | 59/64 |
| 34 by 5 | Continental | " | " | 22 | 59/64 |
| 36 by 4 | Fisk | " | " | 24 | |
| 36 by 4 1/2 | Fisk | " | " | 22 | 13/16 |

None of the 34 by 4 demountable sizes seem to be close enough to your rims to allow of their use. When the rim is too small, a steel band can be shrunk on, and when the rim is too large, the excess may be turned off, in both cases providing the difference is not too great. In the six cases given you will have to: (1) turn off a piece 1/4 in. thick all around; (2) turn off 9/64 in. all around; (3) turn off 15/128 in. all around; (4) add a band 49/128 in. thick; (5) turn off 5/32 in. all around; (6) add a band 7/16 in. thick. That is up to you.

As for the projected change from 32 in. diameter of wheels to 34 in. diameter wheels, the only change which this will make is to increase the speed of the car, as the engine in question will stand "the racket." The increase would be 6 1/4 per cent. at all speeds; that is, the speed of the car with 34 in. wheels would exceed the speed of the car with 32 in. wheels at any one given engine speed by 6 1/4 per cent. Similarly, the change to 36 in. wheels will increase the speed 12 1/2 per cent. over the 32 wheels and 5 3/4 over the 34 wheels.

If the power of the engine were so close to the actual requirements as to lose by this change, the loss would be the exact proportion given above as a gain.

## MISTAKEN IGNITION IDEA

Editor THE AUTOMOBILE:

[2,125]—With Maxwell, Moline, Cadillac and half a dozen other well-known manufacturers changing from high-tension to low-tension ignition, you do not say a word about it in the columns of "The Automobile." Why don't you tell your readers something about this wonderful change of heart?

We thought the high-tension magneto almost universal in this country as well as Europe, and surely would like to know why so many manufacturers are changing on their 1910 cars. Please let us know why this change is made. J. B. SMITHE.
Washington, D. C.

As it is ordinarily understood, high tension means the use at the cylinders of jump spark plugs, which are furnished with a high tension current. On the other hand, the ordinary idea of low tension is the use of make and break plugs furnished with a low tension current. If this is your understanding of the two systems, you are absolutely wrong in your statement that many manufacturers are changing from high to low tension ignition.

In fact, the only changes which have been made in this direction in the past two years have all been in the opposite direction; that is, from low to high. So far has this tendency carried that to-day it is a matter of extensive searching to find more than a half dozen makers all told who use the low tension, while all the rest of the 350 or more manufacturers use high tension. More than this, several of the cars included in this statement have also fitted the high tension as an auxiliary, so that the number using low tension exclusively would be less than a half dozen.

On the other hand, you may have been splitting hairs, in that you meant to distinguish between a true high tension magneto delivering a high tension current direct to the plugs and a low tension magneto delivering a low tension current to a coil, where it is stepped up to a high enough tension to jump the customary gap. If this was your idea, in that also you are absolutely mistaken, as the tendency seems to be toward the self-contained and self-complete magneto producing a high tension current direct to the plugs.

## STOPS RADIATOR LEAKS

Editor THE AUTOMOBILE:

[2,126]—I have an aluminum radiator on my automobile, which is leaking slightly, probably half a gallon in half a day. Do you know of anything that could be put in the water so as to stop this leaking? Shop men think that it would be hard to solder. I doubt if it leaks in more than four or five cells, and it may be confined to one.
Bainbridge, Ohio. A READER.

Aluminum can be welded—that is, soldered—but this work is not done by every one, and if you decide to have it fixed in that way be sure to go to a specialist in the line of aluminum. Otherwise you are liable to pay for a good job and get a poor one.

As for filling it from the inside, this can be done, but is a makeshift job at best. In a letter published in the Dec. 2 issue of THE AUTOMOBILE you will find that a writer says of a 25 per cent solution of glycerine in water, used to prevent the water freezing up in cold weather, that it forms a jelly which fills up all small leaks.

This being the correct time of year to resort to anti-freezing solutions, you might try this, but when warm weather comes around again you will be confronted by the leakage problem. That being the case, why not have it properly attended to now?

## CRANKSHAFT TROUBLE

Editor THE AUTOMOBILE:

[2,127]—I have read your column of "Letters Interesting, Answered and Discussed" for some time, taking great pleasure in so doing. Now, I wish to ask a question referring to a two-cylinder opposed motor of standard make, water-cooled.

This engine is hung on a subframe, with the crankshaft extending out from the crankcase. The transmission is assembled on this extension of the shaft, which is in one piece and as a bearing at each end. This engine has broken three or four crankshafts. In the last two we took care to see that the bearings were all lined up perfectly. When through, the engine ran true without binding at any bearing. The engine usually runs about three or four months in each case before breaking. Every one of the shafts broke in the same place, the crank part of the shaft. On the last one it looked as though the metal might have crystallized. Can you give me some pointer as to where to look for the trouble. A SUBSCRIBER.
New York City.

It would be hard to diagnose the trouble from your description, as, for instance, what is the crank part of a crankshaft? However, we think from the scant description that you have a case in which the load is applied outside of the bearings; that is, the loading is eccentric.

This should never be; there should be a bearing on each side of the load, not alone from a mathematical consideration of the fact that this reduces the bending moment to one-fourth and the shear to one-half of what it would be with the same load overhung, but from strictly common-sense reasons.

Although you do not say exactly, we surmise that there is no bearing beyond the transmission. If this is the case you should have a new shaft made, with a prolongation beyond the transmission. Then you should make a bearing for this prolonged end, making it adjustable if possible. You will then have a bearing on each end of the crankshaft proper, and a bearing at each end of the part used as a main shaft for the transmission; that is, considering the one engine bearing in each case, once as an engine bearing and once as a transmission bearing.

If the engine and transmission are set across the frame, as we surmise, you can easily attach this extra bearing to the frame on that side, using care in the length of the new shaft, so as to have it long enough to reach to the frame. When this is done your trouble will entirely disappear; that is, if the size of the shaft, considering the material of which it is made and the work it has to do, is sufficient. If this is not the case it will continue to break, whatever you do.

Crystallization, of which you speak, might occur once, or at the outside, twice, but it is improbable that it would occur four or five times in the same place.

# ANSWERED AND DISCUSSED

## SOLVES W. T. K.'S TROUBLE

Editor THE AUTOMOBILE:

[2,128]—In "The Automobile" for Nov. 18, I find that W. T. K., Nichols, Conn., inquiries as to the effect of ⅛-inch space between valve stem and valve lifter upon the power of the motor. Your information on this point does not coincide with my experience with this very trouble. I have a little "one lunger" Olds, which was in very poor condition in respect to valves when I took it in trade. I could get no speed out of it. After figuring on the thing, after having it at several repair shops, and several times, too, with no better result, I put a new cam on the time shaft or rod. Even then, I was going slower than other machines of the same make and type.

I then noticed the play between the valve stem and lifter, and after thinking it over, decided the higher the valve was lifted in the explosion chamber, the quicker the cylinder would exhaust after the combustion, and naturally there would not be as much obstruction or load for the flywheel to work against. The intake valve, I reasoned, would take in a bigger charge the higher it was lifted. To take out both valves is quite a job, so I took layers of tin and shoved them in between the valve lifter and stem, leaving about the space of one piece of tin. To hold these in place, I next cut a piece of tin about two or two and a half inches square, cutting out the corners so as to leave it in the shape of a cross as per enclosed sketch. Then I cut along the dotted lines, and shoved it under the stem. Filling the space above it with as many thicknesses of tin as were suitable, I turned up the four sides, pressing the ends under the coils of the spring where possible. To do this I had to do one end of the cross at a time, as follows: Turn up the first side, place the tin washers in position, turn the whole thing to the right 90 degrees, turn up the second side, turn again to the right, turn up the third side, then turn to the right again and turn the last side. Before the last side is turned up, all of the layers of tin desired must be inserted inside of the little basket formed by the folded up cross. When I took the car out after doing this, well, she ran in such a way as to give some pleasure to me, and I judge that I had gained from 25 to 30 per cent. in power and speed.

As to W. T. K.'s machine pounding when hill climbing, I think he has the spark too far advanced. My car will not pound on the level at a certain speed, but when I climb up grade and the speed is materially reduced, and I leave the spark unchanged, the pounding begins. This is due, no doubt, to too early explosion. If I have erred in analyzing the matter, I am always willing and glad to be corrected. F. W. K.

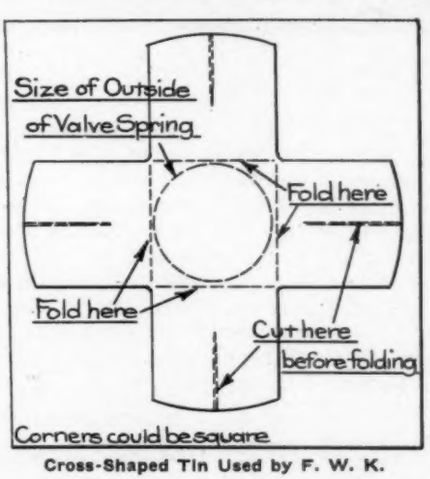
Los Angeles, Cal.

As your power and speed were not measured, we are forced to take your estimate of the very large increase as a very rough guess. In our letter to which you refer we stated in part as follows:

"The way in which it will influence the power is this: when the adjustment is used to reduce the space and with it the noise, the timing of the valves will be altered slightly, and this slight alteration *may be such as to change the power.* For instance, the engine might have a rather late exhaust closing, which the adjustment would make still later. This, then, would cause the motor to heat and thus lose power. Similarly, the adjustment for the inlet valves might cause them to close either too early, making the charge incomplete, or too late, so that some of the charge was lost, also making it incomplete."

What you did was to alter the timing, just as we said decreasing the space would do. Your situation was such, however, that this alteration of the timing improved matters; that is, by opening the exhaust earlier you cleaned out the cylinder quicker, which aided in the increase in power. Also, opening the inlet earlier allowed you to take in a larger charge, which helped the power.

Cases have been known—the writer knows of several—in which this change reduced the power developed. The engines, however, were modern engines with fairly good timing. The changes in the clearance were such as to make both valves open too early, so that the exhaust opened too quick, losing the effectiveness of part of the power stroke, while the inlet opened so early as to allow much of the exhaust gas to flow into the inlet pipes and thus foul the incoming mixture. The effect of this on the power can be imagined.




Cross-Shaped Tin Used by F. W. K.

Or, if your imagination is not good, try it on your engine, that is, turn your camshaft driving gears back one or two teeth from their present position, and note the effect. As a matter of fact, correct timing has as much or more to do with the power and speed which an engine will develop, as has the correct size of valve and valve ports, together with the proper lift of the valve. If the timing is correct, you can help power and speed by increasing lift and area of valve opening, and similarly, if the valve port area and lift are well chosen, the resultant power or speed, or both may be greatly increased by carefully improving on the previous timing relations. All this on the assumption that the engine (as in your case) is an old one, dating back before the present valve timing knowledge was prevalent, which as a matter of fact would take you back but five years.

## MYSTERIOUS SKIPPING

Editor THE AUTOMOBILE:

[2,129]—Will you please give me, through the columns of your paper, a suggestion for the following trouble: I have a Buick, Model 10, 1908 pattern, which has run perfectly until recently. Now the engine skips both under load and empty. I have newly charged storage battery, new dry cells, wiring seems good, all connections are tight, valves have just been ground in, cylinders recently cleaned of carbon, compression is good, and alike in all cylinders, intake manifold has no leaks, have tried new spark plugs, have cleaned the timer thoroughly. The timer shows no wear, and looks to be in perfect order. The timing is the same as when the car was received from the factory. This engine is fitted with a Kingston carbureter of the ball type, which has just been overhauled at the factory. Gasoline flows freely to the carbureter, and I have drained the tank and refilled it with fresh gasoline, carefully strained through chamois. The spark seems very good when the plugs are tested in the open air. I might say finally that the motor runs the same on each cylinder, as proven by holding down any three of the vibrators. BONARD DAIN.

Lawrenceburg, Ind.

You have covered all of the possible sources of trouble of this [illegible] so that it seems as if you must have taken some of it for granted. Thus, you say that the wiring *seems good.* Are you absolutely sure that it *is* good? The wires might be broken somewhere within the insulation, so that the break was not apparent. You know, the exterior of ignition cables is usually examined, but as a matter of cold, hard fact, the exterior does not do anything at all, the interior being the working portion.

You do not seem to have mentioned the inlet valve guides in the cylinders. Do these fit tight, so that you could be sure no air leaked in through that source? If you cannot, that is a frequent source of trouble.

Your last statement that the motor runs the same on any one cylinder, as proven by holding down any three vibrators, would seem to show that the trouble was back of that point. This would mean that it was either in the coil itself or back of the coil. The latter would include the two batteries and the wiring from each to the coil.

Borrow a coil, known to be all right, from some friend, substitute it for yours, and see if the same trouble exists then. If it does, that test exonerates the coil and reduces the other items to four, the different batteries and their respective wiring systems to the coil.

Moisture is frequently absorbed into the interior of a coil, practically ruining it for the time being. Knowing this to be the cause of an incipient short circuit, the coil can be dried out before a slow fire, or in what is called a slow oven, making it then as good as new.

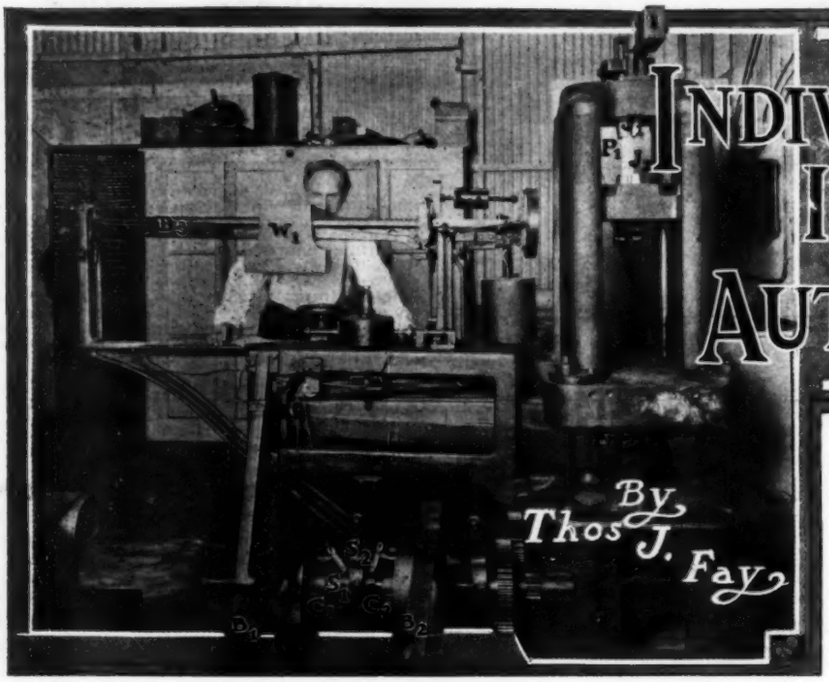
## SOLUTION OF TROUBLE

Editor THE AUTOMOBILE:

[2,130]—I want to compliment you on the contents of "The Automobile." Every issue seems to be better than the rest. I received a copy of another motor car paper the other day, and must say that there was as much comparison as between the cheapest of the cheap magazines and the Review of Reviews.

Kindly inform No..... who has trouble in starting his two-cylinder which has a puddle carbureter, that he described my trouble for the last two years, but now have it cured and guaranteed to stay cured as far as I am concerned—sold the machine—go thou and do likewise!

Ashtabula, O. HOMER P. SMITH.



# INDIVIDUALITY IMPARTED TO AUTOMOBILES

By Thos J. Fay

Fig. 1—Olsen testing machine for use in determining physical properties of materials used in Rambler cars for best results

STRUCTURAL materials look very much alike to the casual observer, and referring to steel in particular, it is even difficult for the most skilled metallurgists to discriminate as between the several conditions in which the material may reside. In view of this mal-situation, considering the importance of quality in a kinetic machine, as an automobile, it is scarcely to be expected that quality will be conspicuous in the absence of precision of method, and method itself is reduced to mere desire when the facilities available fall below a certain level.

If it is desirable to select the testing equipment for a given plant, in the light of the work to be done, it becomes necessary in any profitable discussion to take some complete plant as an illustration of the points to be made. True, there are certain features that may be common to all, and in the hands of men of great skill it is even possible to foresee that deviations may be improvised to accomplish specific purposes, even though the facilities may not be up to a fitting requirement. In the long run, however, the best results will obtain if the facilities are contrived in the light of exact knowledge of the service to be rendered; and in the plant of Thomas B. Jeffery & Company, Kenosha, Wis., which it is the purpose here to use as a concrete illustration of the points to be made, the entire system of testing in vogue is being worked out to accomplish just the results that Thomas B. Jeffery purposes delivering in Rambler automobiles.

**New Laboratory Much More Commodious**—Before launching into the details of the process, it may be well to say that prior to the erection of the new laboratory which is now being whipped into shape the various tests were made in the several departments, to a considerable extent under the direction of departmental heads, but as the process is now being evolved, all testing of every character will be done in the general laboratory under the direction of Thomas B. Jeffery, thus enabling him to direct the staff of assistants to a greater extent than ever before, and owing to the specific character of the facilities and the gathering of all the processes under one roof, it is a reasonable expectation that the increased output of the plant, which is growing at a rapid rate, will be handled far more promptly.

**Consistency Is a Jewel in Testing Work**—If it is conceded that it is necessary to test motors at all, it must be allowed that it is desirable to test every motor made. If it is an advantage to run one motor for a time sufficient to eliminate undue fixed losses, it is equally a gain to run all motors made long enough to bring them, respectively, up to the standard set by testing one motor. Individuality in an automobile is only assured provided every unit in each car is given individual attention on the part of the skilled men who are capable of ascertaining as to the maximum attainable results when each unit in one car is tested in a laboratory.

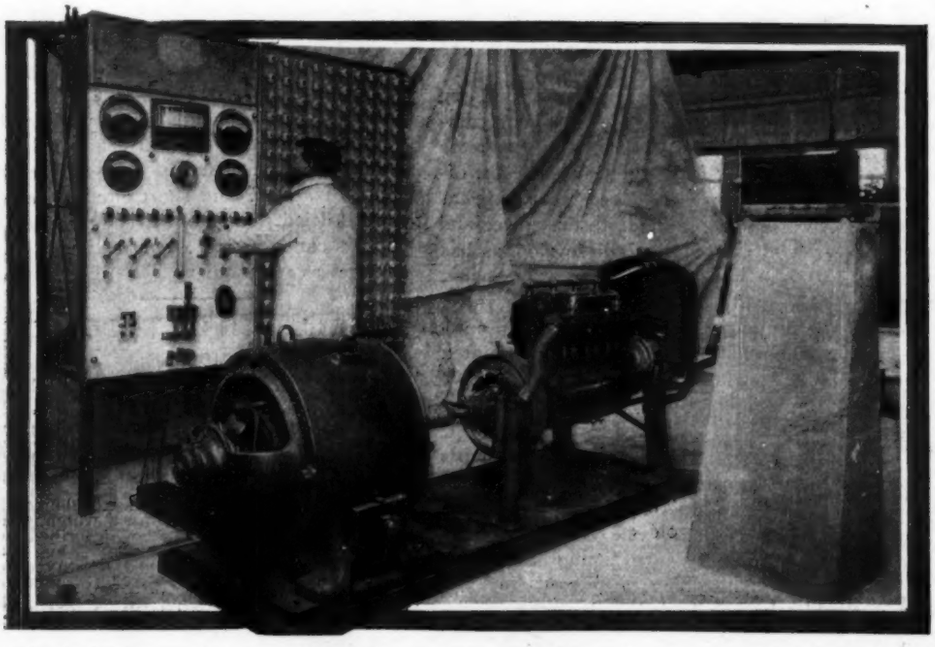


Fig. 2—Jeffery method of testing motors, using a plurality of dynamotors electrically joined and in compensation for economy's sake

The difference as between a laboratory and a test room lies in the extent of equipment available for the specific work; if the equipment is in presence sufficient to investigate one motor at a time, it is a laboratory process pure and simple, whereas, if this equipment is duplicated as many times as may be necessary to test the entire output of a plant, day after day, the laboratory becomes a test room, as it were; and comes a test room, as it were, in every sense of the word, and

if the equipment is just that required for a laboratory, it is then that tests may be made on a laboratory basis.

**Sharp Lines Must Be Drawn Betimes**—In a laboratory on a large scale (which is what the Jeffery plant comprises), it is necessary to distinguish as between the class of investigations which have to be made in order to keep abreast of the times, and the proving-out process by which the manufactured product is given its final O. K. This phase of the problem is cared for by properly classifying the work somewhat as follows:

**CLASSIFICATION OF TESTS TO BE MADE.**

(A) Investigations of materials as offered to determine as to the advantage of considering them for future use.

(B) Investigations of materials purchased for use, to determine as to their competence in view of the terms of the orders issued for their delivery by the vendor.

(C) Investigations of parts and operations on parts in process in the shop, to ascertain as to the character of the work being done in the shop.

(D) Investigations of assemblies, as motors, transmissions, live rear axles, steering equipment, etc., to check up quality, ability, and efficiency.

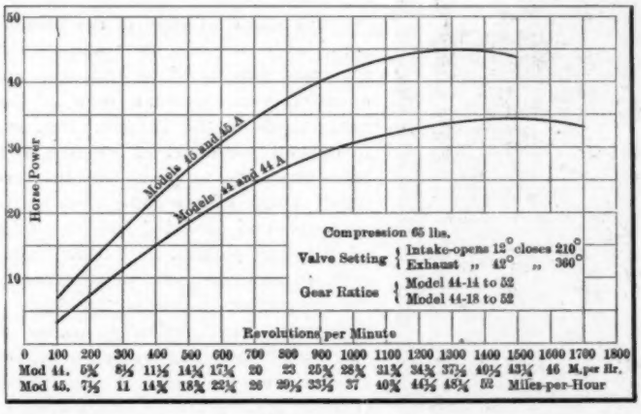



Fig. 4—Torque Curve of models 44 and 45 motors, presenting power for speed at different speeds

(E) Investigations of processes, to improving quality, increasing production, and assuring greater interchangeability.

(F) Final tests of units, as motors and the finished automobiles.

In Class A the nature of the investigations is on a strictly laboratory basis, in which, with a view to future improvement, it is the desire to determine as to the accuracy of claims of vendors, for materials which are not regularly on the market but which promise more than is obtainable in the regular way. This class of work demands the service of a skilled investigator who is capable of discriminating as between the several products in a commercial, as well as a physical, sense, on the ground that while a thing may have more than a little merit, even so, if it cannot be had with certainty, it is scarcely worth considering.

Class B products have to be investigated in order to ascertain if they are up to purchasing specifications, not so much because the price agreed upon should fix the measure of value of the products delivered, but in order to maintain the standard of value of the automobiles to be made from that material.

Class C takes into account the inspection of parts being manufactured, and requires that every operation be scrutinized in order that there will be no incentive to use a part that falls below the standard set, which would be true were it found after much work had been done that some operation was not performed properly. The cost of operation inspection is less than the cost of replacing parts spoiled, and this class of work is performed by men who are skilled in one branch of testing only.

Class D is in the nature of a laboratory undertaking, limiting the testing to "first units" prior to the manufacturing process involving quantity, and in this undertaking it is necessary to

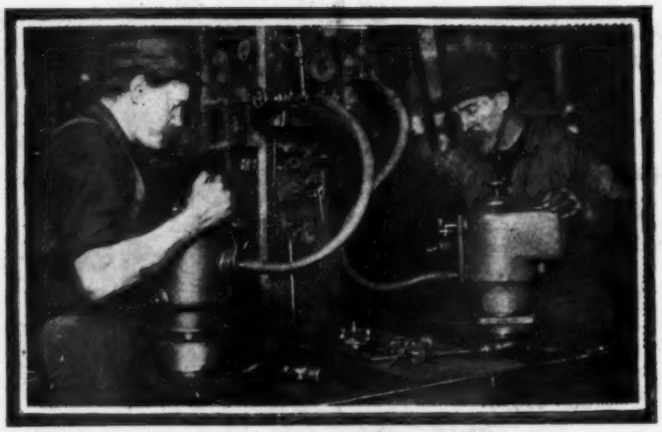


Fig. 3—Hydraulic testing equipment and method of its use in testing for strength and tightness

employ the best skill of the laboratory as accessory to the calm, deliberative judgment of the executive head. Tests such as these demand consideration from every angle, and Thomas B. Jeffery takes personal charge during periods such as this.

Class E ranks as an extra, is most in vogue during the year previous to the putting out of a new unit, reflecting the intention of the company to be positively up to date in the matter of the selection of materials to use in new models.

Class F takes rank as the final test, and in this effort individuality is imparted to the respective automobiles put out.

**The Character of the Testing Equipment Employed**—An Olsen testing machine as depicted in Fig. 1 is used for making Class A and B tests, and the capacity of the machine being 100,000 pounds total effort is sufficient for every purpose. In this process, after the test proofs P1 are machined to proper size, they are inserted in the jaws, J1, when power is applied by means of the belts, B1 and B2, to the counter-shaft, S1, which is given right or left-hand rotation by means of the shifting lever, S2, engaging the clutching members, C1 and C2, thus engaging the right or left-hand rotation at will. The total effort required to part the proof, P1, is registered on the beam, B3, and the sliding weight, W1, is adjusted in such a way as to keep the beam level at all times. A compensating adjustment is available at C1, by means of which the beam is properly balanced before the test is started, and facilities are afforded for charting the characteristic of the metal undergoing test, in order to record the data required for the purpose of ascertaining the modulus of electricity, elastic limit, and elongation.

In the regular course, in view of the many characteristics which may be imparted to steel by heat treating, it is of the

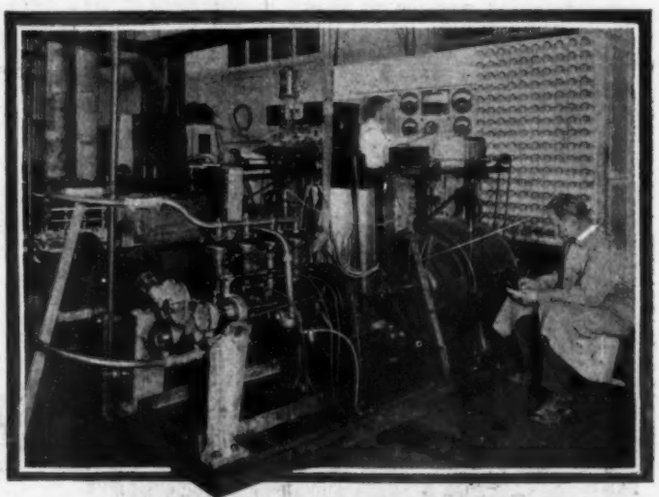
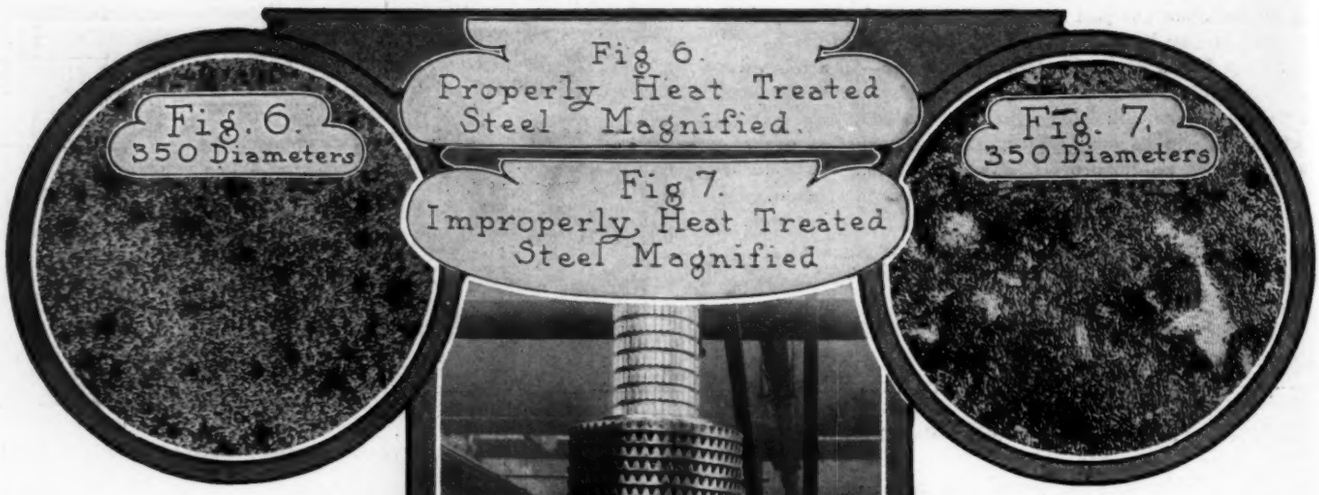


Fig. 5—Method of testing motors using a dynamo-electric machine and a bank of lamps

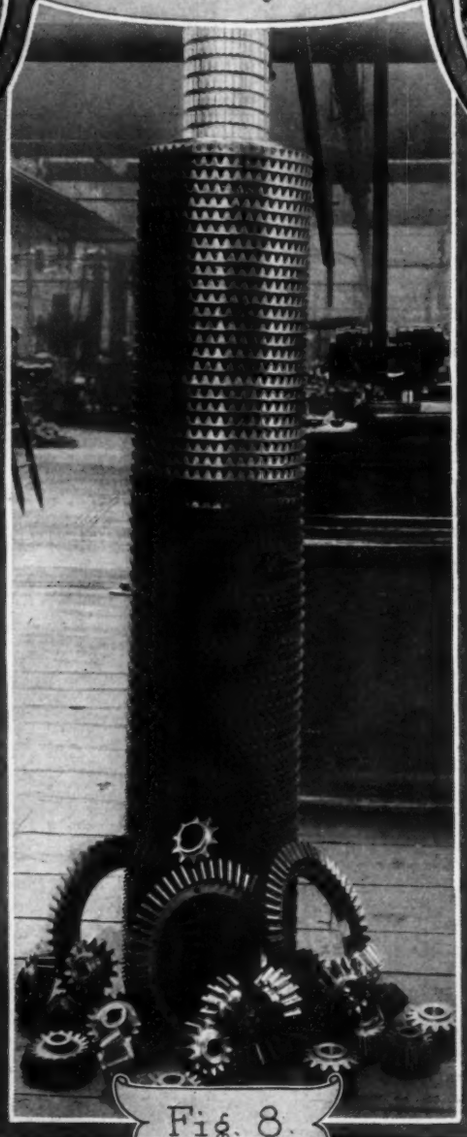



greatest importance to properly record the tests, and in addition to charting, tabular records are taken and filed for reference. Just to indicate the extent to which this phase of the problem has to be dealt with, reference will be made to a brand of steel, noting its several qualities under the different conditions it will assume in the heat-treating process in response to changes in temperature, time, and methods of quenching. (See table.)

**Material Encourages Further Effort**—With a physical test such as this, assuming it is made during research, the next effort would be in the chemical laboratory, and the chemist after checking up results would make his declaration of constituents in tabular form, as the table shows.

The test proof, after fracture, would be examined with a critical eye, and a record would be made showing that the fracture is crystalline or silky, as the case may be, and if it is "cupped" this fact would be noted also; a further investigation of the material would probably be made to ascertain its dynamic character (kinetic ability) which might be done on a "Souther" type of testing machine as shown in Fig. 9; or, a Fremont test would show that even with a notched bar, under impact, a blow of 433 foot-pounds would have no visible effect. This is a marked result which was obtained for this grade of steel in the oil-tempered state, whereas the same steel in the state designated as tempered and annealed went under a blow of 144 foot-pounds in the Fremont test, and to indicate the effect of notching it is only necessary to point out that another sample of the same steel in the tempered and annealed state stood up to 361 foot-pounds. In order, however, to appreciate the significance of the comparison, it will be necessary to understand that ordinary grades of steel fall below these values by a considerable amount, as, for illustration, a rather good grade of nickel steel, of which a record is available, went at 36 foot-pounds in the Fremont test.

**Microscope Lends Facility to Process**—Even metallurgists have trouble in appreciating the differences in the conditions of the respective grades of steel as affected by heat treatment, and recourse is had to microscopic methods to bring up the structure and enable the investigator to determine with greater certainty as to the carbon condition and other molecular characteristics. The reader, in order that he may be in a better position to ap-



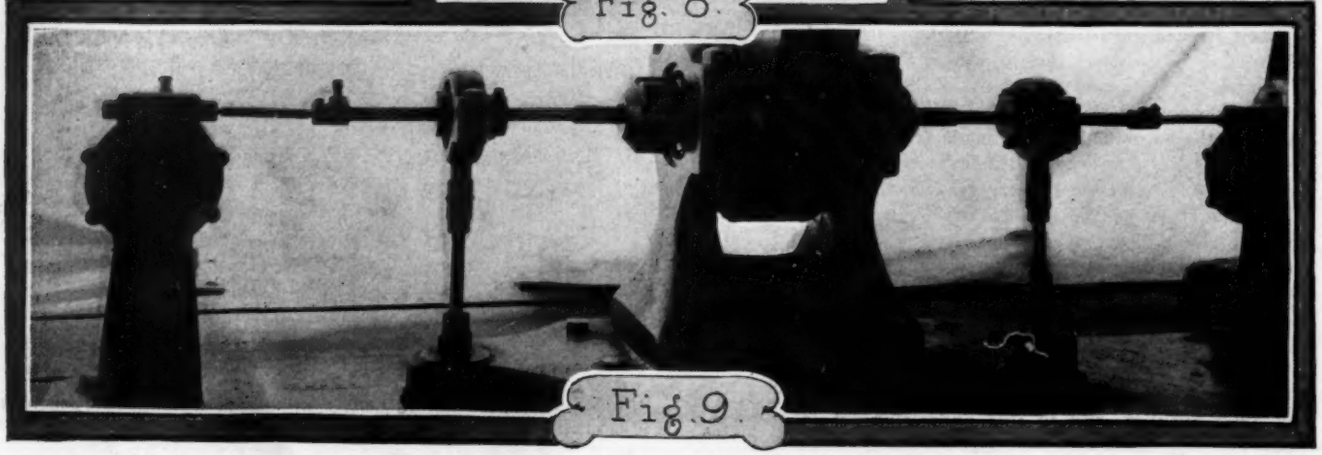




Fig. 8—Bevel gear cementing

Fig. 9—Determining kinetic properties of steel

preciate the situation, is here offered micro-photographs of the steel that is being used as an illustration of the laboratory process, in which Fig. 6 represents a special and desirable condition brought about by heating, quenching, and tempering under well-regulated conditions; whereas Fig. 7 shows a specimen of the same steel which was injuriously treated. In the above examples the microscope was adjusted to 350 diameters, and for the purpose of determining the general character of the material this is about right. Modern microscopes enable the investigator to view the material even up to 1500 (or more) diameters, although it is not believed to be of great practical advantage to do so, as a rule.

VALUES OF THE MATERIAL UNDER CONSIDERATION.

| Condition. | Tensile strength pounds per square inch. | Elastic limit in pounds per square inch. | Elongation per cent in 2 inches. | Reduction of area in per cent. |
|---|---|---|---|---|
| Normal | 120,000 | 110,000 | 25 | 69 |
| Tempered and annealed | 160,000 | 145,000 | 12 | 49 |
| Oil tempered | 280,000 | 262,000 | 3 | 22 |

CHEMICAL COMPOSITION.

| | | | |
|---|---|---|---|
| Chromium | 1.60 | Phosphorus | .011 |
| Nickel | 4.40 | Manganese | .40 |
| Carbon | .28 | Arsenic | .006 |
| Silicon | .20 | Copper | .007 |
| Sulphur | .010 | | |

**Diverse Forms of Furnaces Available**—In the plant, owing to the wide use of drop-forgings and other parts from special grades of steel, it has been found necessary to employ a wide variety of equipment for the processes of heat-treating. Fig. 12 will serve as a suggestion of the methods used, in which, as the illustration indicates, it is very much up to the intelligence of the man; and the years of practice in the Jeffery plant have resulted in a corps of trained men, each one of whom is devoted to some one class of the work, so that if the company has for any reason to dispense with the services of some one man, it is an easy matter for Thomas B. Jeffery to step in, fill the breach, and coach an understudy.

Fig. 10 offers a better idea of the extent of the facilities, this being a view taken in one corner of the large heat-treating plant, where the parts are:

(A) Case-hardened
(B) Annealed
(C) Quenched in oil, water, or otherwise
(D) Tempered
(E) Special treatments.

The particular furnaces shown are for cementing (case-hardening), and, as will be observed, after the parts are packed in bone (which is a matter of employing a suitable box, proper grades of bone or other cementing materials, and much care in the process of packing) they are then run into the furnace, and heat is applied for a sufficiently long time to grow the required depth of carbon. The time required is dependent upon several conditions, as shape and weight of parts, grade of steel used, temperature of the furnace, quality of the bone or other cementing material, and such matters. A means is at hand for regulating the temperature, but what is more to the point, pyrometers are available by means of which the temperature is made known to the men who do the work.

**Certain Parts Draw Skill to the Maximum**—Bevel gears, as depicted in Fig. 8, after they are shaped, must be hardened, and as is well known, they are very prone to warp in the process of hardening. In order to avoid this, since the gears have to be rejected if they warp, they are drop-forged, annealed after each operation, turned up to size, then annealed again, and, after being given every possible attention, are shaped (the teeth are fashioned) in which process the teeth are first "gashed" and finally "sized" in a Gleason planer.

The steel is of a cementing character, and in the process of cementation the utmost care is exercised to avoid over-heating, wide variations, or other changes, such as will tend to accentuate warping during quenching. When the gears are hardened, they are then subjected to a grinding process to bring the bolting (flange) faces true; and the final inspection measurements, by means of instruments of precision made in the Jeffery plant, soon tell the inspector what to do with the gears; if they come true, they are advanced to stock; if they do not, they must be placed in a bin of rejected parts until they can be examined by Thomas B. Jeffery, who reserves for himself the task of determining why the parts fail to respond properly to the process.

Fig. 10—Battery of cementing furnaces, one of which is receiving work, depicting method of handling

**Testing Is Intermingled with Machining**—From what has been said it is self-evident that enforced co-operation is essential to the success of the venture; each part, as it is being made, must be inspected a number of times, may have to be annealed more than once, and it is of the greatest importance to follow up the work and ascertain if the treatments are being made with precision. In order that the work may be properly done within a reasonable figure of cost, it is necessary to provide ample means of transportation in the shop, and Fig. 11 is offered to show what is done to satisfy this end of the situation, it being the case that "industrial railway equipment," as shown, is provided at every point, which equipment is supplemented by an overhead system as in common use in abbatoirs, for the purpose of transferring completed motors to the laboratory and thence to the assembling department after they are tested.

**Power Plant Given Greatest Care**—From the hydrostatic test of each cylinder, as presented in Fig. 3 (which settles as to the strength and tightness of the cylinders) to the motor assembled, are all routine matters under the control of the regular force, but once a motor is lifted off the assembling stand by means of the traveler, it is in the hands of the responsible head of the testing laboratory, and from that time on it is regarded in the light of an individual power plant rather than as one of many motors, and individuality is injected into its makeup.

Fig. 11—Industrial railway system used in the plant for forwarding materials, showing use of tote pans

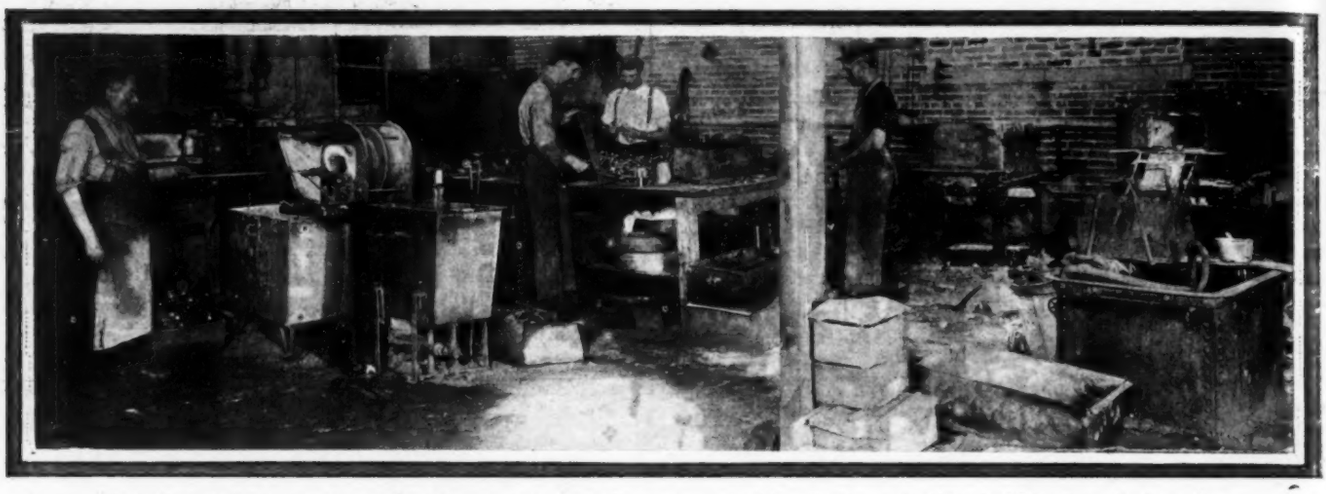


Fig. 12—Portion of heat treating department, with furnaces, quenching baths, and other facilities in actual service

Prior to the completion of the present laboratory, the method of testing motors was not very different from that which obtains in general practice, in which an electric generator is driven by motor to be tested, substantially as shown in Fig. 5. In this work, the motor drives the generator, and the output of the generator is delivered to the lamp-bank with instruments in the circuit, by means of which the voltage, current, and wattage of the generator may be determined, from which the power delivered by the motor may be calculated.

**Present Method a Great Advance**—In the new laboratory, rather than to labor under the disadvantages which attend the older methods of testing one motor at a time, which as a rule results in some of the motors being slighted, a considerable number of motors are placed on stands as shown in Fig. 12, in which the motor to be tested in each case is placed in the cradle, which is so designed that the motor arms fit readily. Each dynamotor is capable of absorbing power as a dynamotor, or, by suitable manipulation, it may be induced to deliver power to drive the motor undergoing test. The dynamotors are shunt-wound, separately excited, and so connected to the control board that the tester is enabled to regulate the whole situation in a definite way. If there are, say, 30 motors undergoing test at one time, one-half of them will be delivering electrical energy to the other half, it being the case that one-half of the dynamotors will be operating as generators, supplying electrical energy to the other half as electrical motors.

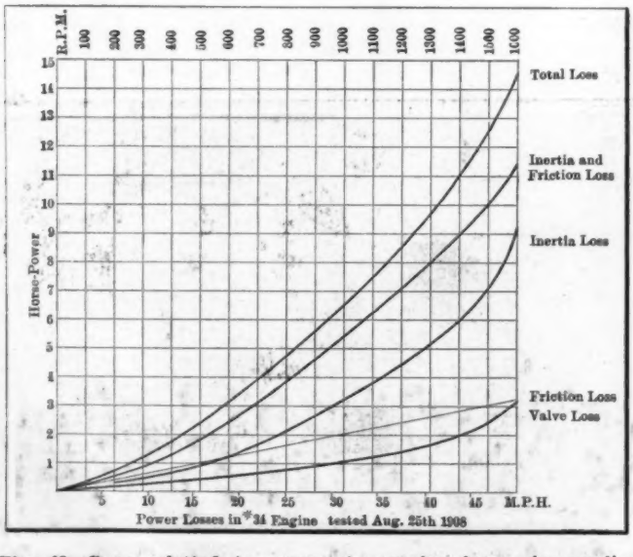



Fig. 13—Curve plotted to represent pumping losses in gasoline motors and subdivisions

If an odd number of motors are being tested, it is obvious that there will be a slightly unbalanced condition, and this difficulty is coped with in an advantageous way; the unbalanced increment is regulated to deliver electrical energy which is transmitted to storage batteries, and they are thus charged. The storage batteries are ultimately employed in the ignition system of the automobiles delivered from the plant, and since they are delivered in the green state by the makers, they are in the best possible condition from a practical point of view.

At regulated periods during the day, the tester shifts the motors that are being driven to a driving relation, and the motors that were driving are thrown to the driven relation long enough to determine the amount of energy required to drive them before they are removed from the stands. In thus ascertaining the power required to drive each motor when it is running at its maximum speed, it is possible to determine as to its mechanical condition, and if the bearings are not in good working order this fact will be rendered at once apparent.

**Each Motor Is Put to the Test**—As the tester discovers by means of electrical instruments and other equipment that a motor is approaching its proper form, it is selected out and made the subject for special (individual) investigation in which the "Purdy" manograph plays an important part when the occasion requires. Before attaching the manograph, however, the bearings are properly run in, it being the case during testing that lubricant is supplied by adding a certain proportion of lubricating oil to the gasoline. Then the temperature of the cooling water is adjusted to a standard, 180 degrees with a raise of six degrees (Fahrenheit) being about right for the best results.

With the motor in good order, cooling at the right point, and lubrication on a standard basis, it remains to plot a curve of speed and torque, which may read speed and horsepower, as shown in Figure 4, which is of model 44 and 45. In this chart, as an inspection will disclose, the ordinates read speed in revolutions per minute of the crankshafts, and abscissa read horsepower. As a convenience and for purposes of comparison, the curve may show equivalents, as miles per hour of the car on the road; as for illustration, taking data afforded at 1,500 revolutions per minute of the crankshaft of the Model 44 motor, the power shown is 34-horsepower and the gear ratio being as 14:52, the car should make 43 3-4 miles per hour on the road; by means of other curves, it will be possible to determine as to the competence of the relations, and if the gear ratio is not right, or if the motor is not up to power, these facts will be disclosed.

**Analysis of the Motor Made**—It has always been easy enough to discover if a motor were below power, but it is quite another matter to analyze the same and locate the particular difficulty which is at the bottom of the trouble. Fig. 13 is a chart giving the results of just such an investigation, dividing

in such a way as to bring out the points to be made, rather with the expectation that they may be brought into greater harmony, possibly, by reducing some of them, and, in some instances, by trading off; that is to say, actually increasing some of the losses, hoping, perchance, that others will fall off at a greater ratio, and, on the whole, make a gain. The losses, as presented in the chart, are subdivided as follows:

(A) Total loss;
(B) Inertia and friction losses;
(C) Inertia loss;
(D) Friction loss;
(E) Valve loss.

In this chart the ordinates read miles-per-hour of the car, which for that matter might be reduced to revolutions per minute of the motor, as is shown at the top, and abscissa read horsepower losses. It is interesting to note that:

(A) The total loss increases at an alarming rate at the higher speeds, which condition is to a large extent due to the influence of inertia (C), and valve losses (E).

(B) Inertia and friction losses curve up at a less rapid rate with increasing speed, due to the fact that the friction losses do not increase at such a rapid rate as the speed increases.

(C) Inertia, which is the bane of motors, increases as the square of the speed, and it is this class of losses that are most difficult to determine, either in designing or in testing motors.

(D) Friction loss, as the curve indicates, is in direct proportion to speed.

(E) Valve losses increase very rapidly at the higher speeds, and must be a serious factor in poorly designed products.

This particular chart is not offered as absolute evidence of characteristic losses of the several genera in motors in general, it being the case that time and many tests will best establish the characteristic. It is by way of a considerable advance in motor building, however, that this form of analysis is offered.

From what is now known, as a result of investigations, conducted under the new conditions, a positive gain, of considerable magnitude, will be experienced in the motors which will have the benefit of the laboratory method of testing the regular Rambler output in future.

**Popping Not Due to Weak Mixture**—Among the discoveries made in the laboratory, for illustration, is the fact that popping back into the carbureter is not possible when the manifold is properly designed. In order to prove this, a spark-plug was placed in the carbureter manifold and was connected up to the sparking system in such a way that the mixture in the same was ignited just as the inlet valve opened, or slightly before. The mixture was then made rich, and verged down to weak, with the result that popping did not take place at all when the regular Rambler intake manifold was used.

When a special, large area, manifold was substituted, popping invariably transpired, which went to prove that when the rate of speed of the mixture in the manifold fell below the rate of flame-travel in the body of the mixture, the flame traveled back to the carbureter, thus inducing the phenomenon called popping. This same test proved that there is something to be considered involving the length of the manifold; if it is too short, considering inertia, and certain other conditions, overlapping, in setting the valves, may lead to complications and popping in the carbureter.

As a result of the investigations which were made under the new conditions it was possible to alter the curve of torque of the motors, over broad ranges, differing widely from the curves as shown in Fig. 4, and it will be proper here to state that these curves are not, now, fully representative of the results attained, it being the case that the motors, in giving them what is termed individuality, are so tuned up that they will fit well, under the conditions determined by service to be rendered, taking into account the gear ratio, weight of the car, general character of the geographical locality in which they will be required to operate, etc.

The evidence, thus far offered, while it is but a small part of the Rambler practice, is sufficient to show that under proper supervision in a shop properly equipped for the purpose, laboratory methods can be applied to every motor turned out. In order, however, to be able to determine if the cars as a whole are up to a fitting standard, it is necessary to try them out on specific grades under fixed road conditions, and for this purpose the company has, on its own grounds, a grade, designed for the purpose, evidence of which is offered in Fig. 14. Besides this grade, which as the illustration shows, offers the facility of 20, 30 and 40 per cent. inclinations, the circular track to the rear of the plant on the company's own ground makes it possible to put the finishing touches on Rambler cars, and individuality is clinched.


Fig. 14 —Special grade constructed to try out Rambler automobiles before delivery affording great advantage

# TECHNICAL FEATURES OF THE NATIONAL CAR

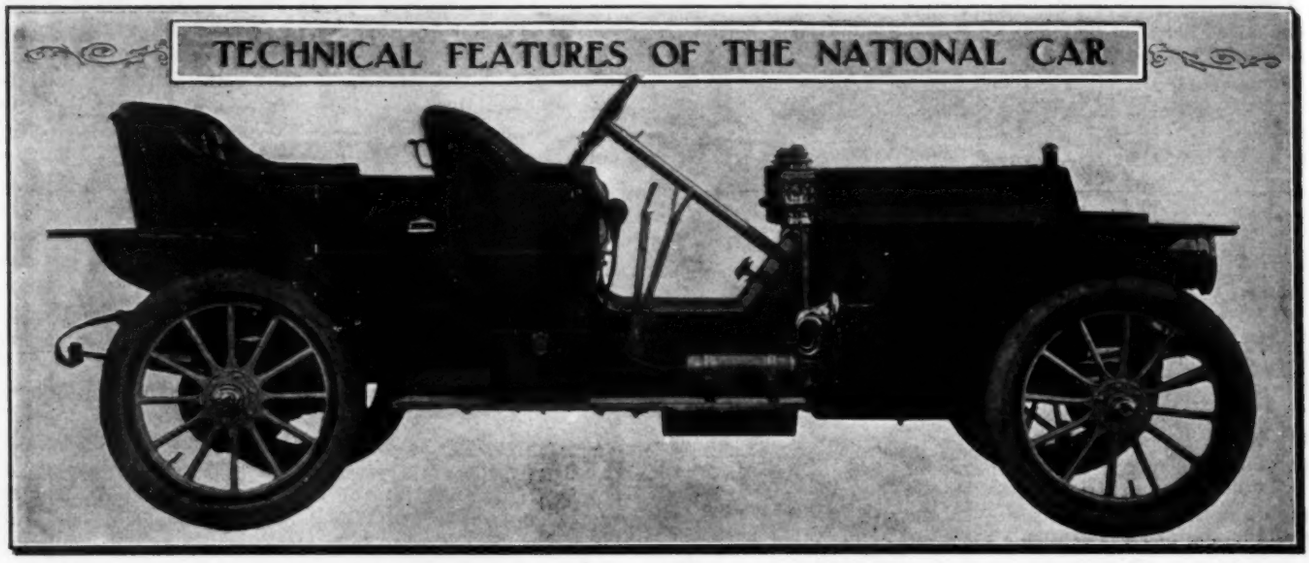


Fig. 1—Four-passenger toy tonneau with roomy driver's seat, ample foot room, large steering wheel, and excellence of control

REFERRING to Model 40, the general appearance of which is well set off in the title illustration, it will be the purpose here to delve into the details of design and construction, without clouding the issue by referring to the general and commercial characteristics of the car. All figures, excepting the title half-tone (Fig. 1), were reproduced directly from working drawings, and the actual product was examined closely by the author at the works of the National Motor Vehicle Company at Indianapolis, Ind., thus checking the drawings with the finished product, it being the idea to present verified facts in technical work of this character.

Referring to Fig. 2 of the chassis, M1 is the motor, C1 is the clutch, C2 is the coupling, T1 is the transmission, U1 is the universal joint, just back of the transmission, secured to the propeller shaft, is within the tube T2, which extends back to the live rear axle housing H1, with the cover off, disclosing the bevel pinion P1, meshing with the bevel gear G1, which gear is flanged and bolted to the differential housing H2, and within the differential gears are nested.

The two differential shafts D1 and D2 take the differential gears and, following out D1, it passes to the left rear wheel, engaging in concentric relation Timken roller bearings B1 and B2, thence passing out to the jaw drive J1, thus disclosing the manner in which the live rear axle is designed as a floating type.

The brake drum B3 is of large diameter, has an outside constricting band, B4, and an inside expanding band B5. The outside band is manipulated by the shaft S1, while the inside member is controlled by the shaft S2. Turnbuckles T3 and T4 provide for adjustment and an equalizing member E1 assures that pressure will be constant on all shoes. Turnbuckles T5 and T6 are placed to afford additional means of adjusting the brakes so that the right tension may be induced.

**Steering Equipment Is of the Straight-Line Design**—Referring to the cross-rod C3, it passes to the rear of the front axle, being straight, and yoked to the arms A1 and A2 by strong drop-forged yokes Y1 and Y2, with large bearing surfaces. The drag rod D3 is straight, has a spring buffer in the terminal piece T7, while the front end of the rod engages by means of a ball and socket of liberal proportions B6 to a boomerang-like arm B7, which in turn is secured to the front knuckle K1 on the right side of the car. For the rest in view of the clearness of the drawing, the design is obvious and this part of the subject will therefore be stopped off, with the single exception that attention is called to the shape and strength of the side-bars of the chassis frame, also to the neat manner in which the cross-bars are joined.

**Important Details of Live Rear Axle**—Referring to Fig. 3, of the live rear axle and propeller shaft up to the point of joining to the transmission gear through the universal joint J1, the

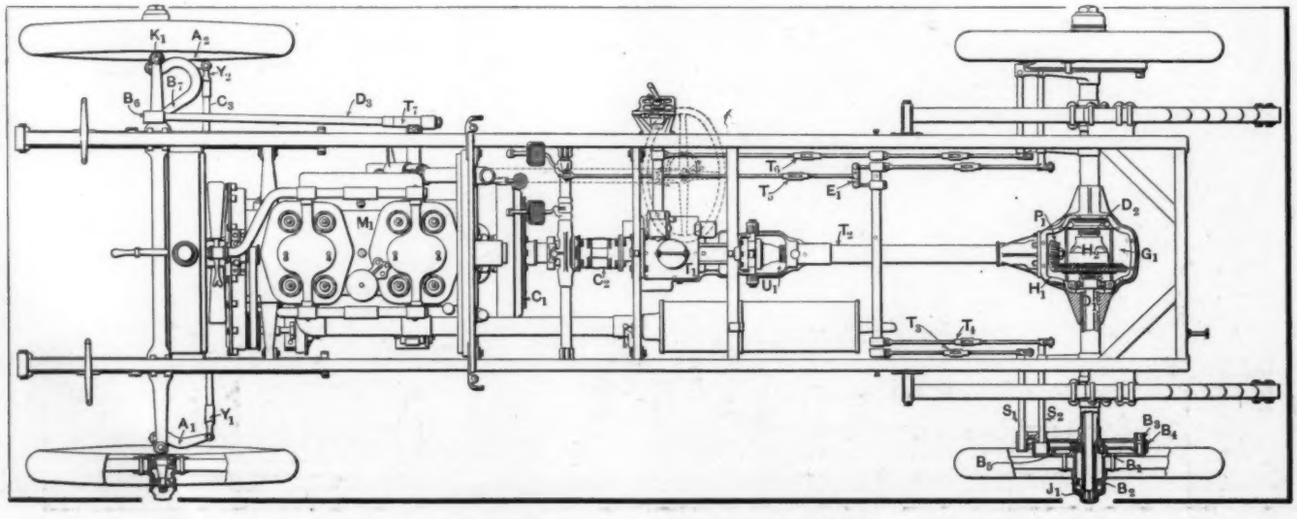



Fig. 2—Plan of Model 40 chassis with units in correct relation, showing nice features in design

propeller shaft P1 turns in Timken roller bearings B1 and B2, is of liberal diameter, being of a selected grade of steel, and is inclosed in a stout tube, T1, which telescopes with terminal forgings F1 and F2. The forging F2 is threaded for the tube T1, thus allowing for proper adjustment of the taper roller bearings B1 and B2, in which the washer W1 serves as an abutment.

Within the shell of the live rear axle, as it looks with the cover off in Fig. 3, the bearing housings H1 and H2 are provided with caps, as shown, and adjustment is made by means of the nuts N1 and N2, with lock-nuts N3 and N4 to prevent them from backing off. The spring perches, one of which is shown at P2, are free to rotate on the shaft-tube, so that the springs, which are two inches wide, do not have to take torsional load, in being handled by the tube T1 exclusively.

**Most Noteworthy Details of the Motor**—Experience has taught that, no matter how good a motor may be or of what the materials may consist, lubrication is at once assurance and insurance; assurance that the motor will not become an immediate source of trouble on the road if it will run at all, and insurance of a minimum of depreciation.

The table of motor torque shows the ability of the same, the dimensions of which are as follows: Bore, 5 inches; stroke, 5 11-16 inches; it being of the four-cylinder type, with water cooling, working four-cycle in the conventional way, the most important point being that the valves are relatively large and the compression is adjusted to match.

The method of testing is that of the electro-dynamometer and, as the test record states, calibration for internal losses was cared for, hence the final readings for horsepower are to be relied upon. The horsepower readings at the several speeds are such as to indicate that the "pumping losses" are well within bounds, which is indicated when the power is noted to be 47.68-horsepower at 900 revolutions, and by doubling the speed the power, instead of falling off at an alarming rate, is steady at 80 horsepower. As the test further indicates, the limit of power is not reached even at 1,800 revolutions per minute, although in practice it is scarcely to be expected that the motor will be required to work at this higher speed, unless in racing on tracks of quality, as the Speedway at Indianapolis, advantage might be taken of this higher speed.

**How the Lubricating Problem Is Coped With**—By referring to Fig. 4, which is a section of the crankcase, longitudinal at A and cross-sectioned at B, it will be observed that the lubricating oil is held in a basin, B1, which in section looks as in B2. In the same sectional view the filter F1 is placed, and the arrows show that the oil flows in, it being cleaned at this point. The crankcase is scooped out, or, better yet, it is contrived with a false bottom, B3, with well-holes, W1 and W2, leading into a passageway, P1, connecting the two, and at the mid-position of this passageway a third well-hole, W3, is placed, the purpose being to equalize the flow of oil, preventing it from piling up when the car is negotiating a grade, and in this way the cylinders are prevented from becoming fouled.

Referring to the cross-section B, Fig. 4 again, the oil-pump P2

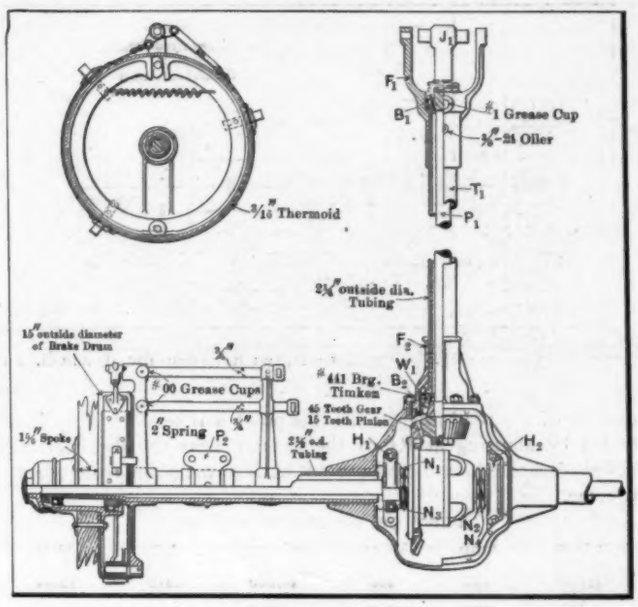



Fig. 3—Live rear axle, showing torsion tube, propeller shaft, bevel drive and floating system

is located in the bottom part, is driven by the vertical shaft S1 and Oldham coupling, O1, prevents the shaft from being cramped and allows the gear-pump entire freedom, so that the members are free in the housing.

A telltale pipe, P3, leads up to the telltale T1, which enables the operator to note if the pump is working and if oil is present in sufficient quantity to serve the purpose. The return pipe P4 takes the oil away from the telltale so fast that the glass does not cloud up. From the return telltale pipe P4 the oil leads through the passageway P5 and thence on to the respective points to be lubricated, as L1, L2, L3, and L4, for the main bearings of the crankshaft, as shown in the view A, Fig. 4. The crankpins are lubricated by a splash as at P6, and oil passes out to the herringbone half-time gears, as at G1, while other remaining surfaces receive such profuse lubrication that the whole system works in harmony. In addition to the special means of lubricating, as here presented, grease cups are placed at all points of vantage, the idea being to keep out the silt of the road, and maintain noiselessness for the greatest possible length of time, as measured in years. It is generally well understood that noise will creep into a car in a short time if the joints wear, and they will if they are permitted to go dry. Grease cups then, in addition to the regular lubricating system, assure life and absence of noise.

The bearings at every point are long, the projected area is liberal, and the working pressure is such that there should be no trouble, even were the lubricating problem less carefully cared for. It is a noteworthy point that the oil cannot sneak out, nor

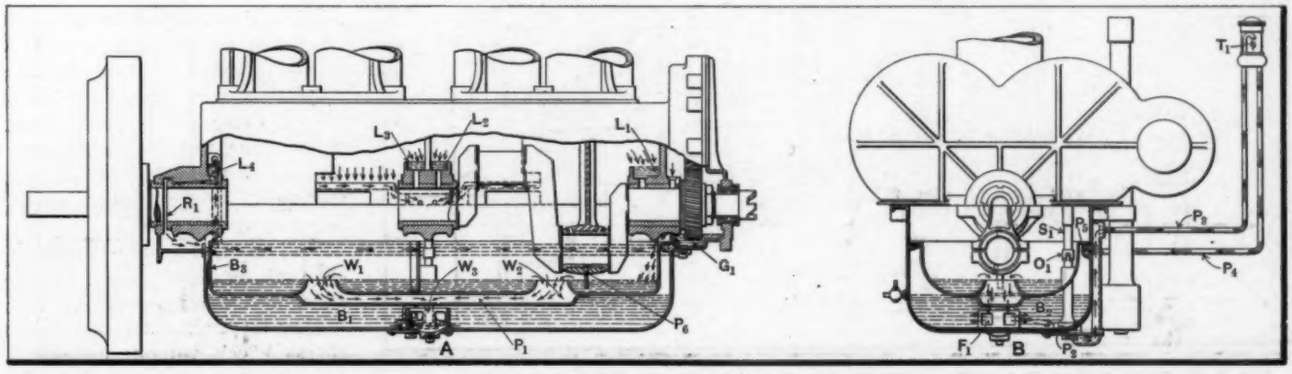



Fig. 4—Sections of crankcase offering evidence of a well-designed lubricating system

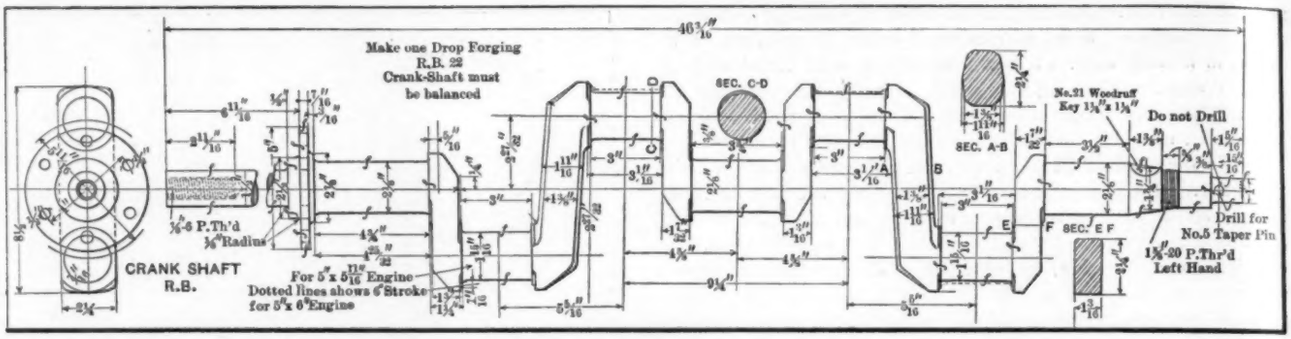



Fig. 5—Crankshaft, with flange for flywheel, substantial cheaks, liberal bearings and good material

can silt of the road migrate in; this point will be sufficiently illustrated by glancing at R1 of the bearing next the flywheel; the arrows indicate how the oil returns back to the point from whence it came.

TEST OF MODEL 40 MOTOR.

| R.P.M. | Amp. | Volts. | Watts. | Eff. | H.P. |
|---|---|---|---|---|---|
| 1,800 | 162 | 295 | 47,800 | .800 | 80.00 |
| 1,600 | 152 | 285 | 43,350 | .813 | 71.50 |
| 1,500 | 151 | 275 | 41,600 | .827 | 67.35 |
| 1,450 | 185 | 220 | 40,700 | .823 | 66.35 |
| 1,400 | 183 | 215 | 39,350 | .825 | 64.00 |
| 1,300 | 115 | 315 | 36,225 | .77 | 62.72 |
| 1,200 | 125 | 290 | 36,250 | .79 | 61.16 |
| 1,100 | 130 | 260 | 33,800 | .797 | 56.62 |
| 1,000 | 140 | 222 | 31,080 | .803 | 51.60 |
| 900 | 148 | 200 | 29,600 | .828 | 47.68 |
| 800 | 145 | 184 | 26,680 | .843 | 42.20 |
| 700 | 148 | 154 | 22,792 | .852 | 35.64 |

**A Substantial Crankshaft Presides**—The dimensions of the crankshaft are given in Fig. 5, showing symmetry in design, a flanged flywheel, rigid throws, and a condition of excellent balance. The material is crankshaft steel of a selected grade, it being heat-treated to accentuate kinetic qualities. The setting for the crankshaft is best shown in the section of the motor as given in Fig. 6, and in the same section will be found divers features of design which have proven out, among which the timer T1 is up above the cylinders, where it can be gotten at.

The valves V1, being 2⅞ inches in diameter, have inserted guides G1 and means of adjustment J1, which stay put. The camshaft C1 is of special hardened steel and the cams, one of which is shown at C2, are cut integral, care being taken to have them accurately ground to size. The arms, which reach to the sidebars of the chassis, are bolted onto the aluminum housing of the motor, and rigidity is thus joined with a certainty of the quality of material, on which dependence must be placed for the hanging of the motor. At the front end the starting crank S1 is held in disengagement by the spring S2, and the engaging jaws J2 and J3 are supported in good form by an extension, E1, of the motor case, with an outboard bearing, at which point a grease cup is located.

The water jacket around the combustion chamber W1 is commodious, and especial attention is called to the absence of a plug in the cylinder head H1, but a column is there and a priming cock, P1, is provided for, a hole being drilled in the column for the purpose. The pistons P2 are light, made of a fine grade of gray iron, and are strongly ribbed. The piston pin P3 is prevented from floating out by the capscrew S3 and four piston rings, R1, R2, R3, and R4, assure tightness.

The fan F1 is of substantial design, runs in annular ball bearings B2 and B3, and is rigidly supported by the pedestal P4 to the motor case. The water piping P5 is of liberal diameter, well made, and joined to the cylinders by fittings F2, which are at once neat and lasting.

**Cone Clutch of Great Simplicity**—Fig. 7 is a section of the cone clutch with a leather facing, L1, and flat springs are placed under the leather around the periphery for the purpose of pressing the leather into proper engagement. The clutch is flanged, F1, and a long bearing, B1, serves to maintain concentric relations. The square spring S1 presses the clutch into engagement, and adjustment is secured by pressing the thrust block of the ball type up against the other end of the spring. Thrust is equalized by means of the ball thrust-block T1, and the universal joint back of the clutch J1 occupies a dual capacity, in that it compensates for flexure and takes up endwise motion.

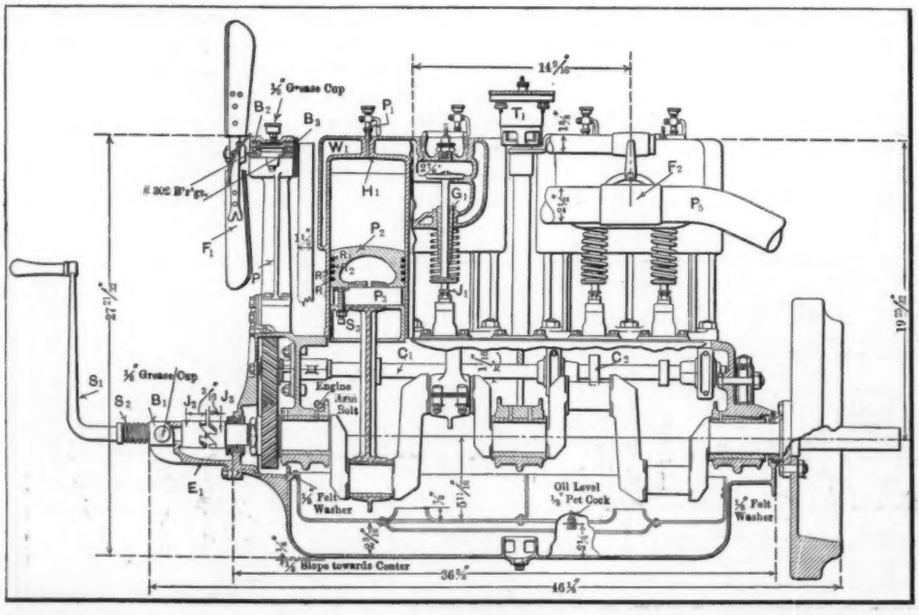



Fig. 6—Motor in section to present evidences of power at all speeds, using large valves, etc.

Of the many remaining features, they will have to be shown rather than discussed, and Fig. 8, which is a side elevation of the chassis, will suffice for the purpose. The transmission, for illustration, is a three-speed and reverse selective, with the lay shaft below as shown at T1, in which annular type ball bearings are at every point. The drive is straight line, and dust preventers D1, together with grease cups at every point of vantage, makes for long life and noiselessness.

The rear springs are three-quarter elliptical scroll type, with numerous wide, thin, flat plates rather than a smaller thick plate, the idea being to absorb shock without inducing excess strain in the material of the

springs. At the front end, in view of a substantially constant load, the springs are half elliptic, but the plates are wide, thin and retained. The radiator is situated back of the centre of the front axle, which augurs for easy riding, and the general appearance of the car is pleasing, partially on this account, and for numerous other reasons besides.

The I-section front axle is of the most approved shape, and with 36-inch diameter of tires, in view of lightness of the car as a whole, the cost of maintenance should prove as agreeable as the riding qualities are said to be.

**Notable Features of the Accessories**—The water pump, which is of the centrifugal type, of liberal capacity, and designed for long life, is located on the right side of the motor, above the top of the chassis frame, hence accessible, and is driven by an Oldham jointed on a stub-end, which projects out of the pump casing, on a line with a stub-end of the gearshaft, projecting out from the housing, which covers the train of gears, of which the half-time gear system is a part.

The pump is placed on a ledge of the crankcase, and it being flexibly connected to its drive, there is no question of lineing up to be coped with. The pump shaft, where it extends through to the back, is utilized to drive the magneto, but in order to maintain the scheme of flexibility, and overcome trouble in lining up the accessories, a double universal joint is intervened, so that the magneto is also above the chassis frame so far as accessibility is concerned, and being flexibly connected, it may be removed, and replaced, at a moment's notice.

The magneto, which is a Bosch, works in conjunction with a coil, and a storage battery which is the source of the auxiliary electrical energy used in the coil. The wiring is very neatly and securely placed, tubing being used to house the same, and the timer, being at the middle of the motor, is in a very satisfactory location from the point of view of accessibility, and haphazard wiring arrangements are eliminated.

**Double Universal Joint in Transmission**—Flexibility, while it is being discussed in connection with the placing of the accessories, may as well be mentioned in general, it being the case that a double universal joint, of very substantial characteristics, is located in the system, just in front of the transmission gear, the virtue of which is manifold. This dual universal joint in front of the transmission gear is in addition to the universal connection of the propeller-shaft tube. The mere use of a very substantial chassis frame, in this car, is not construed as sufficient, and the whole machinery equipment is so placed, considering flexure, that none of the elements will be pinched, under any circumstances, and noiseless performance, to a marked degree, is realized, partly due to the shapes used, and again, due to the close fitting which is allowable.

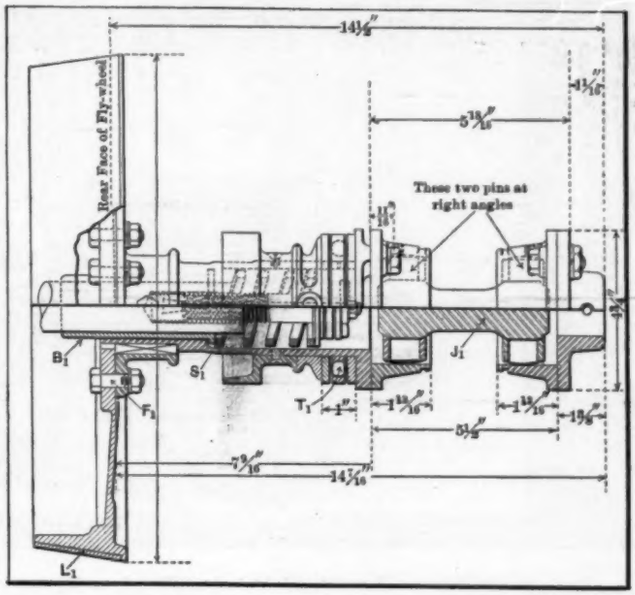



Fig. 7—Section of clutch, of the cone type, with square spring, leather facing, and ball thrust bearings

**Radiator and Water Piping Well Placed**—The radiator, of liberal capacity to wipe heat out of the cooling water, is placed just back of the front axle, thus adding materially to the general appearance of the car, and the water piping, which is neatly made, is flexibly joined, yet even so, this flexibility is not at the expense of quality, since the hose joints, as made, do not include long lengths of hose. The piping, where joints are made, is so closely jointed that almost no hose is exposed to the action of Winter's cooling solutions, which latter products are usually so made up as to destroy the hose. In testing out, every car is afforded enough individual attention to impart to it a certain precision of performance, it being the aim of the maker to earn a reputation for uniformity, in performance, of every car made. The chief tester, with good facilities, is enabled to try out every car, after the regular (routine) testing is completed, thus checking the regular tests, with a view to safety.

Perhaps the neatness of the mudguards, aprons, and trim in general is worth praising, as a rule; however, in a car of this quality, such details are, as a matter of course, right. Then, the shape, and finish of the mahogany dash is worthy of notice, and the equipment in general, as lamps, tools, etc., are on a sufficiently high plane to match up with the rest of the car.

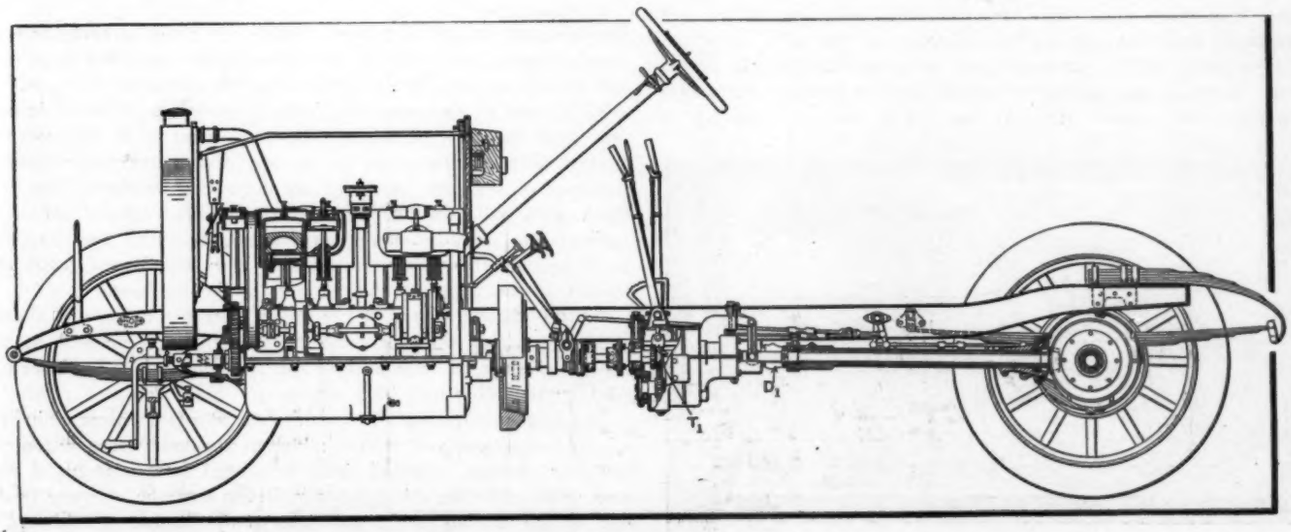
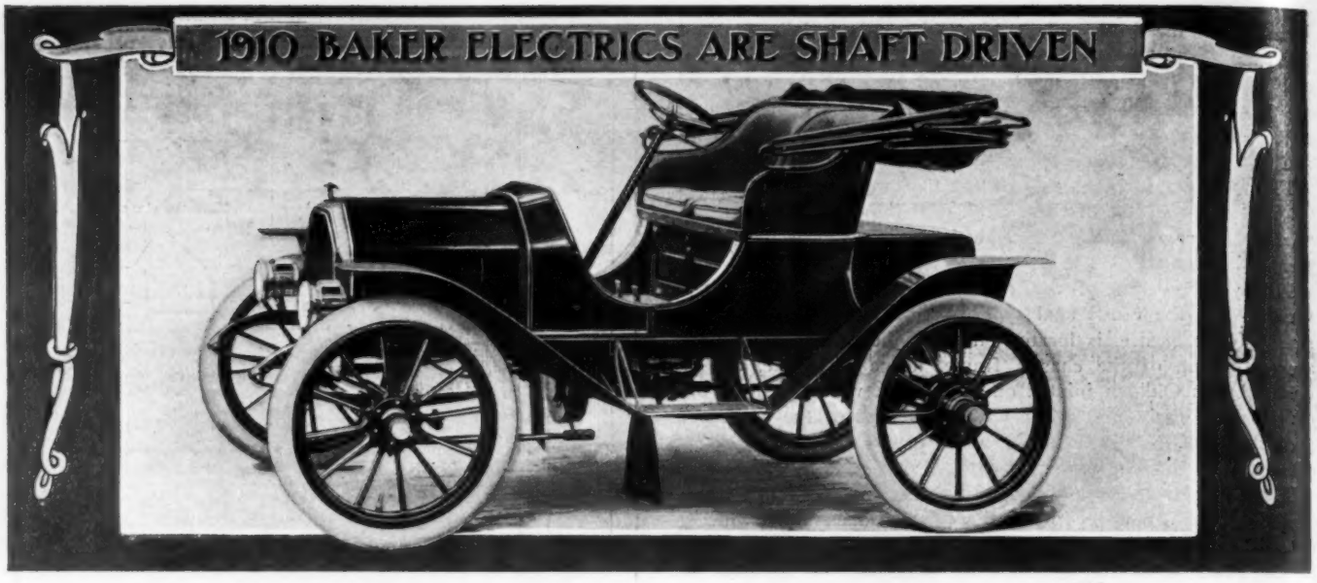



Fig. 8—Side elevation of the chassis, depicting spring suspension, straightline drive, and other features




Baker Electric Runabout Has Wheel Steering, Bonnet in Front, and Closely Resembles Smart Gasoline Runabout.

IN CHANGING from chain to shaft drive, for use on electric cars, the Baker Motor Vehicle Company, Cleveland, has taken a most radical step, and one that will be commended by all who have followed the progress of the two drives on gasoline-driven cars. In that field, the shaft has supplanted the chain, for obvious reasons of cleanliness, simplicity, protection against dirt and consequently wear, absence of lost motion, and improved lubrication.

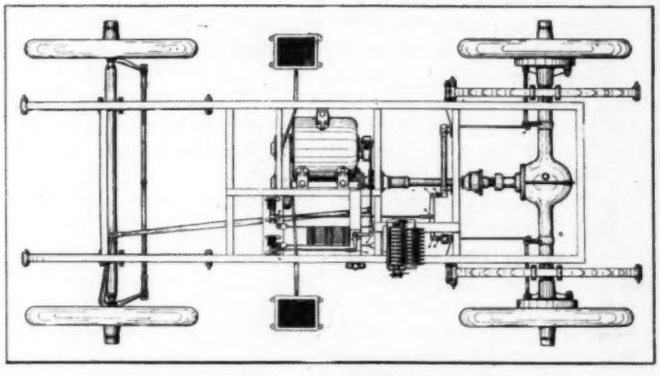
Arguing forward from this, the electric manufacturers have said, why does not the same line of reasoning apply to our class of vehicles? In adopting it for all vehicles, the Baker company has taken the stand that it does, at least, to their complete satisfaction. This step will cause much comment in the industry, for this concern has always been a leader, and if the other companies follow this lead, it means the extinction of the chain for all but commercial trucks.

**Bevel Gear Tried First on Large Cars with Success**—The company has used the bevel gear with perfect success on larger types of cars, but has only succeeded after many years of experimenting in perfecting an improved bevel-gear shaft drive, which is suitable for small cars, and which at the same time excels in efficiency all other forms of transmission.

It has been found by experience, the officers of the company say, that the chain drive loses its efficiency on account of its imperfect lubrication, accumulation of dust and stretching of the chain; they claim that the new bevel-gear shaft drive will maintain and even increase the efficiency of the car.

The bevel drive, rear axle is of the semi-floating type of the very latest design, approved by the best engineers. To secure lightness and greater strength, the entire rear-axle housing is drawn from sheet steel. All the bearings in this axe are of the ball-bearing type of the highest quality. The axle and drive shafts are made from vanadium alloy steel, carefully heat treated.

Special describes the differential, with which, all of the gears in the rear-axle housing, including the differentiating gears, are made from the highest-grade steel, specially obtained for this purpose. They have planed teeth and are hardened by a special process. The differentiating gears are mounted on a three-arm



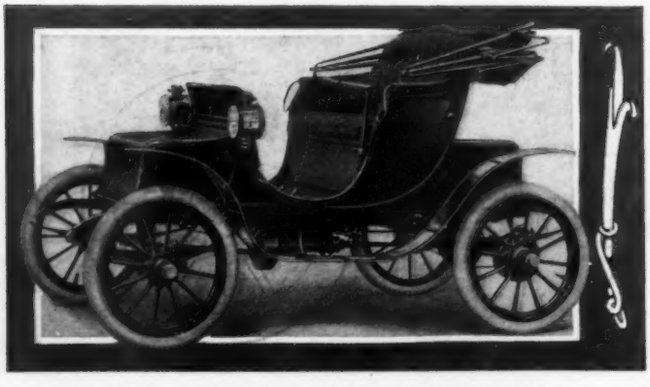
Chassis of All 1910 Baker Electric Cars Are Alike.

member and careful provision is made for a self-aligning movement of these gears. The fit for all bearings is provided by grinding to limit gauges, and maintained within limits of .00025 in.

Sheet steel is the material of the front hubs. This is drawn out from the flat sheets in presses to form it to the correct shape. The resulting hub is in one piece, and consequently, stronger. These hub pressings are accurately machined and are fitted with ball bearings of the best quality. The front axle spring seats are machined from a high-grade steel and the tube is of special semi-spring temper steel with dropforged yokes attached to the tubing by the electric welding process.

**Renold Silent Chain Drive from Motor**—A Renold silent chain (provided with an eccentric adjustment) enclosed in an oil and dust-proof case is used on the reduction gear, insuring silence, flexibility and high efficiency.

The transmission shaft is constructed with two universal joints of the latest approved design, allowing absolutely free action of the rear springs. One of these is located just in front of the rear axle, while the other is away forward, at the extreme front end of the driving shaft, and close to the motor. In this way, the full benefit is gained of the double universals.



Victoria Is Along Regular, Approved Electric Lines.

The front ends of the full elliptic rear springs are suspended from the frame by a novel shackle (patent applied for) which is an entirely new feature in spring suspension. This construction permits the omission of the radius rods and the torsion rod, assures perfect alignment under all conditions with a maximum of safety, and eliminates absolutely the rattle so objectionable with radius rods. All springs are of the special spring steel and are provided with reamed bronze bushings. All spring bolts are made from alloy steel, ground to size and are provided with special attachment for oiling.

**Salient and Valuable Motor Features**—The motor is of a special four-pole design, series wound, with unusually large commutator. It is larger than motors ordinarily used and possesses an electrical characteristic which makes it almost impossible to injure and insures continuous service with the highest possible efficiency, without requiring any attention whatever. This accounts in part for the long life of the batteries in Baker cars.

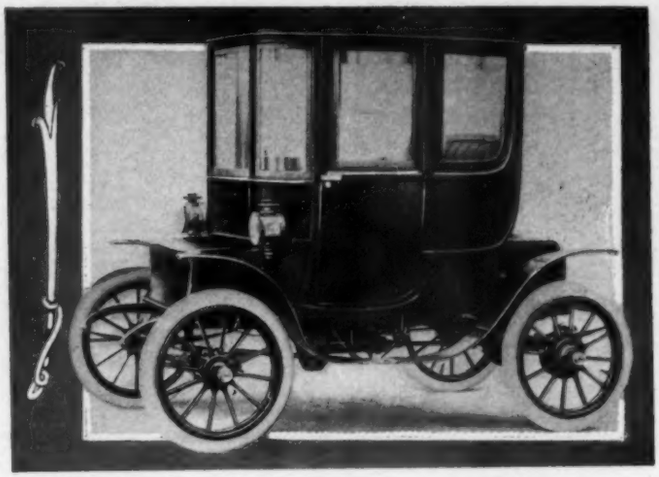
Three-point suspension is used in hanging the motor in place, one arm at the right side and two at the left holding it securely, yet so as to be readily and quickly removed. These supporting arms are bolted to the subframe built in for that purpose.

The latter, that is the frame, is of pressed steel, channel section, with the open side turned in. There are five cross members, one at the front end, and the usual rear stiffener. Then there is one at the line of centers of the front spring hangers of the rear springs. The other two are placed one on each side of the motor, with the subframe connecting the two.

**What the Controller Shows**—The patented controller is of the continuous torque drum type with six speeds forward and three in the reverse, all controlled by one lever. No special pedals or switches are used. This controller permits the various speed changes without arcing or fusing, and accomplishes a gradual increase of speed from step to step with a small increase of current consumption, and without any jerking motion, either in starting or increasing speed. It is also provided with a safety device which precludes the possibility of slipping into the reverse when shutting off power.

Another feature of the new models is the special lock (patent pending) for the controller. This device is extremely simple and is independent from any electrical connection, being purely mechanical and of absolute reliability.

**Other Car and Equipment Details Worth Knowing**—Wheelbase on the new models has been increased to 80 in. by moving the front axle forward farther than in the old models and extending the frame. This makes the cars ride more easily.



Baker Coupe for Cold Weather Is Inside Driven

Bodies of the 1910 models are more roomy, more comfortable and unsurpassed for elegance, style and beauty of design. All cars are equipped with continuous fenders.

Standard battery equipment for victorias and coupés has been increased from twenty-four cells to twenty-eight cells 9 MV Exide, in series at all speeds.

All new-model cars are equipped with three brakes, two internal expanding brakes attached to the rear wheels which are lined with thermoid, insuring long life and absolute reliability, and an emergency brake attached to the motor. All brakes are operated by steel rods, the expanding brakes on the rear wheels being controlled by one pedal with an equalizing bar inserted, which secures equal pressure on both brakes.

Special care has been taken in wiring. The wire sizes are abundantly large to carry the heaviest possible loads without loss of power directly from the battery to the controller and from there to the motor. All mechanical connections are tight and securely locked. The entire wiring system is mechanically arranged and the wires are insulated to resist acid and weather, as well as mechanical strain, the best rubber being selected as none too good considering the work to be done.

# ELECTRIC THAT MADE GOOD ON THE MUNSEY TOUR

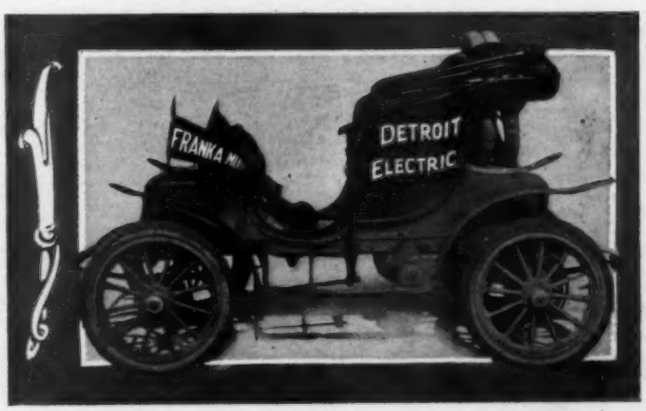
ORDINARILY, when reference is had to gasoline automobiles, it would scarcely be considered of moment to note the performance of any one example merely because the car may have mad a long run. Thre are so many people, however, who have the wrong impression about electrics that to fail to feature an electric which did come through the Munsey run on time would show lack of appreciation of the state of the art.

It will be remembered that the Munsey run, from Washington to Boston, angled along, taking the run of the roads, for a distance of 690 miles, the whole distance having been made within six days, which, considering the state of the roads, was regarded by the committee as a notable performance for "gasolines," for which the run was organized.

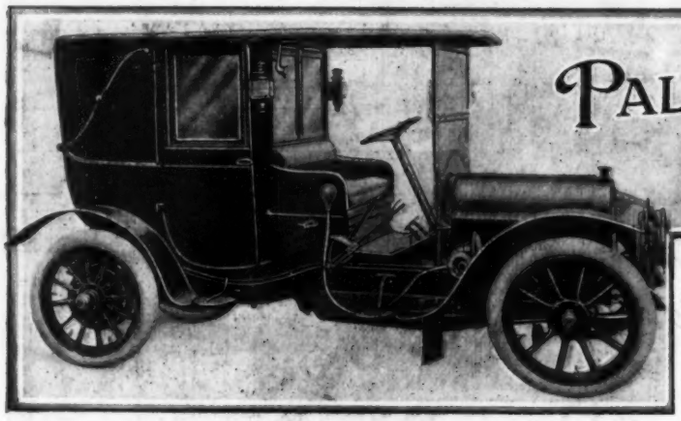
The Detroit Electric, as here illustrated, made this run; made it in good time, made it in good fettle, and made history in the doing, according to the best judgment of those who have some competence to judge.

It was a performance without an incident, from the car point of view, unless note is taken of two tire punctures and many surprised citizens who never did think that an electric would be able to stay in the run. To begin with, rain and general inclemency of weather rendered the going so difficult that the gasolines waddled about duck-fashion to a degree, and it is just this point that should be enlarged upon in discussing the sturdy Detroit electric.

The car illustrated is a regular stock Detroit, known as a victoria. The battery was just as this class of equipment is supplied to all Detroits, and in the run the performance was in the absence of any changes, either of battery or otherwise.




Detroit Electric Which Made Great Run in Munsey Tour.



# PALMER SINGER 1910 MODELS

Dropped Frame of Town Car Is Distinctive

CONCENTRATION, the aim of all American people, is the right word to apply to the method in which the Palmer-Singer Manufacturing Company, of 1620 Broadway, New York City, and Long Island City, is attacking the problem of automobile production for the coming season. By this means, and aided very materially by a model factory of large size, recently completed, the 1910 output will reach the figure of 4,000 cars.

Leaders in the line of cars will be the six-cylinder 60-horsepower car known as Model LXII, and the four-cylinder 30-horsepower machine called Model XXX, the latter being also produced, in slightly changed form, as a town car. All models are shaft-driven, have four speeds, with direct drive on third, multiple disc clutches. I-beam front axles, and many other noteworthy features. Space prevents a full description of the many good features of these three models, or even of the well-equipped factory, but the salient points of the six-sixty and the four-thirty will be mentioned in some detail.

**Description of Big Six Engine**—The motor is 4⅞-in. bore by 5½-in. stroke and develops its rated 60-horsepower at or below 1,200 revolutions per minute, reaching its maximum power at about 1,600 revolutions. The cylinders, pistons and rings are made of titanium iron, a very strong, dense and homogeneous metal, capable of taking a very smooth finish. These parts are given the final finish by grinding, which insures perfect accuracy. The long light pistons have four rings each, besides suitable grooves for distribution of oil upon the cylinder surface, and their tops are finished smooth to prevent the accumulation of carbon, and consequent misfiring and laboring.

Piston pins are hollow, with hardened and ground surfaces, and are secured in place by a set screw at each end, positively locked to prevent unscrewing. The nickel-steel drop-forged connecting rods are light and strong, due to careful distribution of metal, and of a length insuring but slight side pressure on the cylinder. Crank pin ends are lined with special metal bushings and the piston ends have bronze bushings.

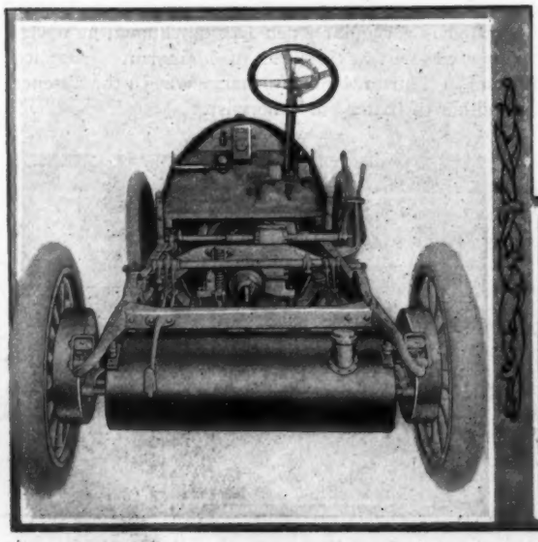
Inlet and exhaust valves, located on opposite sides of the motor, are 2⅜ in. in diameter in the clear opening and are made of a special heat-resisting grade of steel. Note that these valves are nearly half the diameter of the cylinder. The valve stems work through interchangeable bushings, easily renewed in case wear produces enough play around the inlet valve stems to allow air to leak in and affect the running at low speed.

Cams are accurately ground to a master cam and the camshaft gears are made with bronze rims and malleable iron spiders, a construction which greatly reduces the ringing noise to which these gears are liable. Noise is further reduced by enclosing the gears, which also protects them from dust and permits perfect lubrication. The exhaust camshaft carries small relief cams.

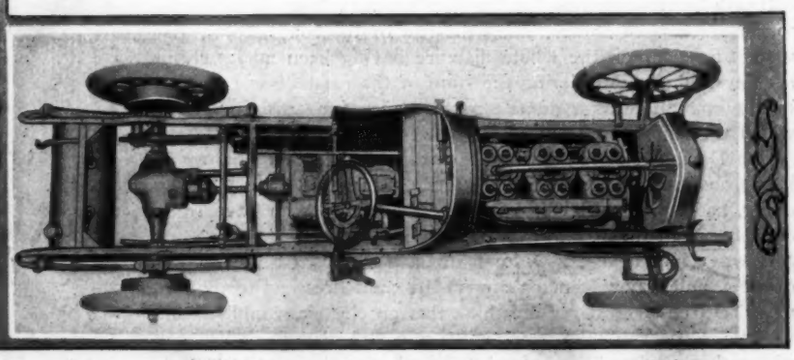
Suitable means are provided for bringing these cams into operation by shifting the entire shaft endwise. The relief cams then hold the exhaust valves open for part of the compression stroke, making the work of cranking the motor much lighter. Valve push rods work in hard bronze guides and have ample bearing surface for taking the side thrust of the cams.

Hardened and ground rollers at the lower end and adjusting screws with inlaid fiber striking blocks at the top, aid in maintaining proper adjustment of the valve mechanism and consequently produce quiet running and efficiency. The crankcase is made of aluminum, well ribbed and strong, and carries all crankshaft bearings in the upper half, the lower half acting only as a cover and oil reservoir.

**Efficient Lubrication Very Important**—The oil reservoir is cast integral below with the lower case and holds enough oil for 300 miles running. A gear pump draws oil from the reservoir and delivers it to a pipe extending the entire length of the upper case, from which copper tubes lead to the main bearings and to the camshaft gears. The crank pins receive their lubricant, through holes drilled in the crankshaft, from the excess oil supplied by the main bearings. The cylinders and camshaft bearings are lubricated by the oil splashed from the bottom of the case by the connecting rods. Every moving part is thus bathed in oil while the excess drains back into the reservoir, where it settles and is filtered before reaching the pump again. A float in the oil reservoir, with a tell-tale extension visible in a glass tube



From the Rear, Showing Dashboard Simplicity



Six-Sixty Chassis from Above Reveals Details of Construction

in the upper half of the case, shows at a glance the amount of oil in the motor. This is useful in filling up and at other times.

Hammered steel from a drop forging made in one billet is the material of the crankshaft. Crank throws are sawed out, after which the shaft is heat-treated and machined. The final finish of the bearings is by grinding, giving a smooth and perfectly round journal. Provision is made at each end, where the shaft leaves the crankcase, to prevent the escape of oil.

**Ignition Details—Only One System**—Ignition is by Bosch magneto and batteries on all models, the latter being for starting only. The magneto is carried on a bracket at the right of the six-sixty motor and is driven by a pinion meshing with the camshaft gear. An Oldham coupling takes care of small errors of alignment and permits quick removal of the magneto. On all models, except the four-thirty and town car, a single coil, a dry battery of six cells and a high-tension distributor are provided for starting. The magneto and battery system each has its own set of plugs. The high-tension wires of both systems are enclosed in a metallic conduit on top of the cylinders, and the points of entry and exit are protected by insulation to prevent chafing.

Proper carburetion for a six-cylinder motor is one of the most difficult problems that an automobile engineer is called upon to solve. This company has devoted much time and expense to careful study of carburetion of six-cylinder motors, and believe that in the multiple jet type of carbureter the acme of simplicity, reliability and economy has been reached.

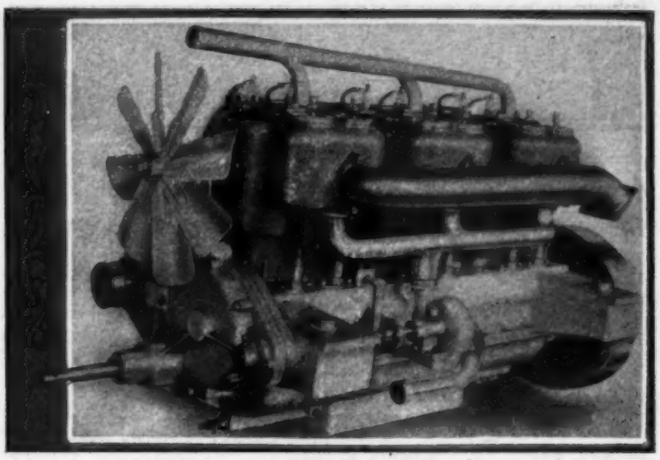
This company claims that it controls the patents on the multiple jet carbureter in this country and takes this opportunity of warning others from trespassing upon those rights. The carbureter contains the usual float and float chamber, from which fuel is led to three nozzles, each in its own Venturi air tube.

One of these nozzles is provided with an adjusting needle, the movement of which is limited to less than a full turn, and the air passage around this nozzle is always open. The other two air passages are closed at the top by check valves, which are controlled by a cam acting in unison with the throttle valve, so that the check valves open successively as the throttle is opened.

Cam adjustments are made at the factory and proper nozzle sizes fixed, leaving only the slight needle valve adjustment by which a purchaser may compensate for variations in altitude, fuel, or atmospheric conditions. Proper arrangements have been made to secure warm air for vaporizing the gasoline and preventing condensation in cold weather.

**Features of Smaller Motor**—Like its big brother, the smaller engine has cylinders cast in pairs, but contrary to it, the valves are grouped on one side. In size, the smaller engine, has a 4½-in. bore and a 4½-in. stroke. As to power, it delivers its rated 30 horsepower at about 1,250 revolutions per minute and reaches its maximum at about 1,650 revolutions. Much that has been said of the design of the six-sixty motor also applies to the four-thirty, so that only the minor differences need be mentioned.

The upper half of the aluminum crankcase carries the crankshaft bearings, which are special die-cast babbitt, as are also the crank pin bushings of the connecting rods. The hollow, hardened and ground piston pins are clamped tightly in the upper ends of the connecting rods and oscillate in bearings in the pistons.



Inlet Side of Palmer-Singer Six-Sixty Engine

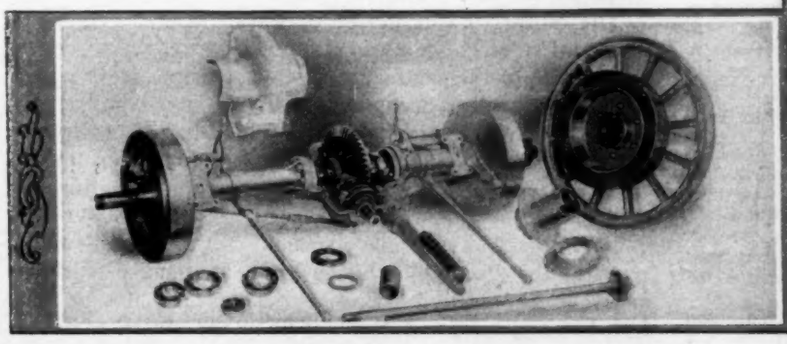
Valves and camshaft are placed on the right side of the motor, while on the left side are the water pump and Bosch high-tension magneto arranged in line and driven by a single gear, but with Oldham couplings between, so that either can be removed without disturbing the other. This motor cranks easily enough to permit starting from the magneto without difficulty.

**How the Transmission and Clutch Are Made**—All the gears have very wide faces and are made of special steel, case hardened to resist wear, and are mounted on very large shafts, reducing deflection and noise to a minimum. Imported annular ball bearings of the highest quality are used throughout. The transmission is of the selective type—that is, any gear may be meshed with its mate without passing through any other gear.

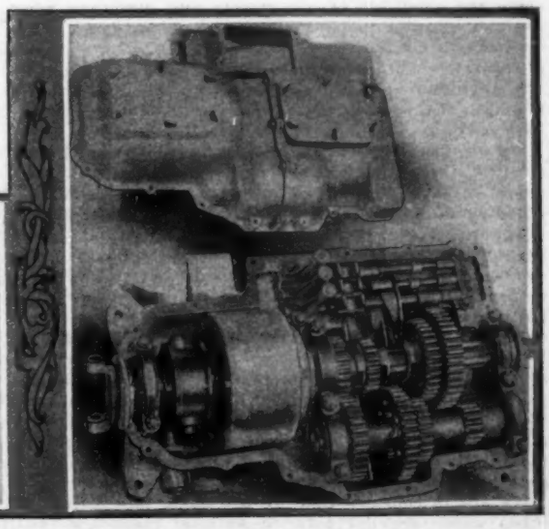
The multiple disc clutch runs in an oil bath in the front end of the gear box. The discs are made of the finest quality of sawblade steel, having great wearing qualities, and will not burn out. This clutch permits of gradual and smooth starting of the car without shock to the gears, transmission, or occupants.

All rear axles are of the full floating type, in which the wheels are mounted entirely upon the stationary axle tube. The driving axles, which engage the wheels by jaw clutches, are subjected to torsional strains only. The wheels have imported annular ball bearings, while four-point adjustable ball bearings are used to carry the bevel gears and take their thrust.

**Wheels and Running Gear Well Cared For**—Tread is standard on all models, but the wheelbases vary. On the six-sixty, 127 in. is the distance, which in the four-thirty is reduced to 115. Town cars should be roomy, if anything, so the town car has 120-in. wheelbase. All front wheels have 10 spokes, and all rears 12. Wheels are of second growth hickory.



Rear Axle Partly Dissembled, Showing Double Brake Drums



Four-Speed Transmission with Cover Removed

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## A KENTUCKY EDITORIAL

In discussing the growth of the automobile industry and commending THE AUTOMOBILE's stand for a code of laws that will protect all users of the highway, an editorial in the Louisville *Evening Post* has this to say:

One of the interesting features of modern life has been the growth of the automobile. It opens a new era in transportation, but what has been done is little compared with what is coming. Let us conceive the condition of our streets and highways when there are three or four automobiles where now we have one. It is not a long look ahead, but we must "look ahead" in order to develop the conditions of traffic under these circumstances which will protect the roads, protect pedestrians, protect the public who ride in the automobiles, and protect those that can have little or nothing to do with them.

We are glad to see that the Automobile Club of Louisville is considering these conditions in a broad and liberal manner. At a recent meeting the club voted to send letters to every owner of an automobile in the State recommending the passage of a bill, to be introduced by Senator Newcomb, making it a felony for anyone to use an automobile for any purpose without the consent of the owner. This will do something to protect the owners of the machines, and protect the people usually injured by this reckless and irresponsible use of the roads.

In New York so numerous have been the fatalities and so brutal have been the actions of certain of the chauffeurs that the feeling against the automobile is probably stronger now than it was three years ago. One of the principal newspapers devoted to this interest, The Automobile, demands a code of laws that will protect all users of the highway and will bring to rigid account men responsible for the disregard of the regulations, whether the responsible man be the owner or the chauffeur.

We are to consider that we are using locomotives on macadam roads which are not patroled as steel roads are, which are not protected by danger signals, which have no train dispatchers, across which men, women and children constantly go and along which all kinds of vehicles take their way.

It is manifest that we must have a code of laws which will clearly define the conditions under which these roads can be used, the maximum speed at which the automobile may travel at diffeernt points along the road, the rights of others to a joint use of these highways, and the restrictions upon all parties as to this use.

One of the first conditions of progress in this direction is obedience to the laws we already have. The cry for more stringent, and, in many cases, unreasonable regulations, is due to failure of many of the chauffeurs to pay the slightest regard to city ordinances, road rules, or the statutes of the State whenever they think they are unobserved.

It is to the interest of all concerned that the users of automobiles be not considered as being in a class by themselves. They are a part of the traveling public. They create a growing part of the traffic which must seek these streets and highways. They cannot (and reasonable men among them do not) claim any special privileges. The roads were here before the automobiles came, and were built by the common contributions of the whole community. The automobiles are entitled to use these highways just as other vehicles are, but they must be subjected to restrictions designed to secure to all the people the greatest benefits from the highway consistent with their common use.

Once upon a time there were daily press comments both rabid and prejudiced; now there is an evident desire to approach the subject in a liberal and unbiased manner. The situation, in plain words, is that the automobilists must assist in purging their ranks of the criminal offenders who arouse these threatened epidemics of antagonistic legislation which cause law-abiding auto owners unlimited trouble in preventing the swinging of the pendulum to the other extreme.

## ART IN AUTOMOBILE BODIES

Although hardly so elusive as the Paris fashions in hats, automobile bodies still show enough of the same infinite variety to keep the average man guessing, and, incidentally, to provide a liberal profit for their designers and constructors. But recently we fancied that we had reached the day when at last a body was nothing more than a body should be; that is to say, a comfortable accommodation for a certain number of passengers, simply and economically built, and possessed of that grace and good taste inseparable from a structure well adapted to its work. We seem to have been mistaken.

To the British Isles we now owe, besides the monocle and the green hat, that specimen of the body-builder's art variously known as the "torpedo" and the "gunboat," though by the irreverent often dubbed the "bathtub." Its originator must have been one of those comic-supplement artists who delight to show an automobile in the act of tossing a benevolent old gentleman into the branches of an apple tree. Whether or no this surmise be correct, one easily traces the baleful influence of comic-supplement tradition in its lines.

The object of this design appears to be the complete obliteration of every natural body feature, reducing the automobile to the semblance of a submarine, from which the heads of the occupants protrude unnaturally. Its boasted advantages include none which have not already been obtained on bodies of normal design. Doors to the front seats were seen long ago. Dust raising concerns principally the underbody. Wind resistance is a negligible factor at any ordinary speed. Let us hope that the reign of the "torpedo" will be brief; its demise will certainly be unregretted. Present designs may not be perfect, but improvement does not lie in the direction of the "torpedo."

# CHALMERS-DETROIT AND HUDSON COMPANIES TO SEPARATE

DETROIT, Dec. 20—In this city, automobile history is made while you wait, so that the announcement of the ultimate separation of the Chalmers-Detroit and Hudson companies into two distinct concerns, following closely upon the Studebaker E-M-F announcement, made a great stir. Ever since Hugh Chalmers purchased an interest in the Chalmers-Detroit Motor Company it has been his ambition to become the controlling factor. The formation in Detroit some time ago of the Hudson Motor Company paved the way for changes that will make this condition of affairs possible. Identified with the latter concern were a considerable number of Chalmers-Detroit stockholders, including Mr. Chalmers, R. D. Chapin, Howard E. Coffin and F. O. Bezner.

After July 1 next the two companies will operate as separate concerns, being owned by entirely different persons. Messrs. Chapin, Coffin and Bezner have traded their Detroit-Chalmers holdings to Mr. Chalmers for his holdings in the Hudson Company and a comfortable cash bonus, and will busy themselves with the affairs of the latter corporation after the above date.

Under the reorganization, officials of the Chalmers-Detroit Company will be: President, Hugh Chalmers; vice-president, Lee Counselman; second vice-president and factory manager, J. J. Brady; secretary, H. W. Ford; treasurer, C. A. Pfeiffer; chief engineer, George W. Dunham, now chief engineer of the Hudson Company.

E. R. Thomas, of Buffalo, it is understood, retains his holding and will continue to serve as a director in the Chalmers-Detroit Company.

Under this change Messrs. Chapin, Coffin, and Bezner gain control of the Hudson Company, which will be officered as follows: Chairman of the board, J. L. Hudson; president, R. D. Chapin; vice-president, H. E. Coffin; secretary, F. O. Bezner; treasurer and general manager, R. B. Jackson; sales manager, E. C. Morse.

When interviewed by a representative of THE AUTOMOBILE, Mr. Chapin had this to say concerning the proposed changes: "We were facing a business problem, and we met it in a business-like way. We have felt for some time that the field of both the Chalmers-Detroit and Hudson Companies was so broad that both should be worked to the limit. We decided that a rearrangement of our executive forces was the best thing to bring about the results desired.

"In connection with my associates, I have the greatest faith in the future of the light car business. I believe that companies such as the Hudson and Chalmers-Detroit, making good cars at low and medium prices, and in position to produce in large quantities, will reap the largest measure of prosperity within the next few years. It is our belief in this bright future for the maker of the light car that has influenced all of us to rearrange our line-up so as to take the utmost advantage of the opportunities offered.

"There will be no change in the policy of the Hudson Company, in its production of cars at a very moderate rate of price, with the highest possible quality that we can put into them. The unusual success of the Hudson "Twenty" roadster argues well for the plans we have in view respecting the future of the company.

"All of us have the most sincere respect for Mr. Chalmers and his ability, and our agreement is entirely a friendly one. The two companies will aim to work in close harmony and to help one another in every possible way in the future."

Mr. Chalmers expressed himself in a similar strain, when seen by a reporter for THE AUTOMOBILE. He said in part, speaking on the subject of the change and its influence on the two companies:

"We reached the conclusion that both companies would develop faster, and all concerned in them prosper more rapidly if there was more concentration of effort along definite lines on the part of some of the officers.

"It is sometimes difficult in the actual management of two distinct corporations for the same set of men to give each concern the full amount of attention that each one should have, and we felt that the Chalmers-Detroit and Hudson Companies each was large enough now to demand the individual attention of its own set of officers. These contemplated changes will not take place abruptly. We shall work into them gradually and naturally, so that the regular operations of either company will not be interrupted.

"I want to say that my association with Messrs. Chapin, Coffin and Bezner has been long enough for me to have learned to know them very well, and to appreciate their knowledge of the automobile field and their ability to carry on successful operations in that field; but, above all, I have learned to have the highest possible estimate of their integrity and ability. We have always been the best of friends and our business relations have been most pleasant. This deal is entirely friendly and will not in any way interfere with our business or personal relations in the future. It is the spirit of our agreement that the two companies, although they will be entirely distinct and operating along slightly different lines, shall continue to work close together and in perfect harmony.

"The policy of the Chalmers-Detroit Motor Company will not be changed in any way. We shall continue to make the Chalmers-Detroit "Thirty" and "Forty." It has been the established policy of the company to offer the public the greatest possible values at the prices asked, and we shall continue to follow this policy."

# STUDEBAKER AND E-M-F DIFFICULTIES STILL UNSETTLED

DETROIT, Dec. 20—The legal controversy being waged between the E-M-F and Studebaker companies, and which still continues to be the leading topic in local automobile circles because of the far-reaching effects of the case whichever way it may be decided, took an unexpected turn last week when Judge Henry F. Severens, of the United States Circuit Court at Cincinnati, granted a temporary restraining order against the E-M-F Company preventing it selling cars to any company other than the Studebaker Automobile Company, of South Bend, Ind.

Judge Swan, of the United States District Court in Detroit, some days previously refused to issue a peremptory restraining order requested by Studebaker officials, and the matter was to have come up in his court Monday of this week, he announcing his determination to decide the question on the merits of the case.

Then Attorneys John S. Miller, of Chicago, and Henry M. Duffield, of Detroit, on behalf of Messrs. Fish, Studebaker and Eames, of South Bend, busied themselves and secured the temporary restraining order from Judge Severens, which is returnable in Kalamazoo, Wednesday, of this week.

The first intimation E-M-F officials had of this move was when copies of the order were served on the majority stockholders, the three complainants constituting the minority holders. Meanwhile, the E-M-F Company had proceeded along the lines originally laid down by Judge Swan, and filed its answer to the application of the Studebaker Company for a restraining order. The annulment of the contract with the Studebaker Company is admitted, but it is declared this action was taken only after the Studebaker Company had violated its contract in refusing to take

the number of cars agreed upon, and that such action was sanctioned by a majority of the board of directors.

It is alleged that the Studebaker Company is not a manufacturing company, has a capital of only $100,000, and that it followed the method of making contracts with dealers to sell the car on a percentage basis; that it took advantage of the popularity of the E-M-F car to force dealers to take the sale of other cars in which the Studebaker Company is interested at low, unfair and discriminating discounts, not sufficient to compensate such dealers, with the result that the demand for the car fell off.

Inasmuch as the demand for E-M-F cars was created before the selling agreement was entered into, it is claimed, the only losses the Studebaker Company would suffer would be in the profits on sales, which are insignificant compared with the damage sustained by the E-M-F Company by reason of the Studebaker Company failing to live up to the terms of the contract. It is maintained in the answer that through failure of the Studebaker Company to take the allotted number of cars in October, November and December the E-M-F Company was put to a large expense in storing cars, and that if it is enjoined from selling its product the factory will have to be shut down. Accompanying the answer is a statement showing that with improvements the E-M-F Company has an investment of $2,582,681 in its six plants, and that it has contracts for material with sixty firms, aggregating $5,000,000. The answer discloses the fact that contracts made by the company for parts and materials are based upon the cost plus a fixed percentage of profits, so that all these firms would be somewhat affected should the factory be closed.

Counsel for the E-M-F Company argued against any continuance of the case, which had been set by Judge Swan for a hearing Monday. However, Judge Swan granted the request of the minority stockholders, who were desirous of having the temporary restraining order disposed of first, and the local case went over for a week, after a stipulation to cease advertising.

In the interim between its rescinding of the selling agreement with the Studebaker Company and the issuance of a temporary restraining order the E-M-F Company had been doing a land office business with agents from all over the country, who flocked here the moment it became known that the E-M-F Company proposed operating independently. Hundreds visited Detroit seeking the agency for E-M-F cars, and President Walter Flanders has for a week or more been the busiest man in the industry. Should Judge Severens decide, on the showing made, to grant a permanent injunction the entire aspect of the case might be changed. In that event it is difficult to see how a long-drawn-out legal battle could be avoided. Indeed, those familiar with the matter now insist that is what it will amount to in any event, as both sides are determined—the E-M-F Company to maintain its identity, it asserts, and the Studebaker Company to continue the selling arrangement it declares is still valid.

## A NEWS BUDGET FROM AUTOMOBILEDOM'S HUB

DETROIT, Dec. 20—Manager John Gillespie, of the Detroit Auto Dealers' Association show, to be held in the Wayne Hotel Gardens, January 24-29, isn't a fatalist. Hence the fact that local entries to date exceed those of the Madison Square Garden show by the cabalistic thirteen doesn't worry him. So far 67 different makes of cars have taken space, or to be more exact have been crowded in. The Madison Square show advertises 54 exhibits of completed cars. And that is one of the reasons Manager Gillespie and officials of the association wear a smile that even their troubles in accommodating all who desire to show can not efface. Approximately 30,000 square feet of space is available at the Wayne Hotel Gardens. If there was twice as much it could all be filled with cars alone. As it is every foot is taken, and accessories manufacturers are barred. This has caused considerable dissatisfaction, but there was no alternative. Some day some enterprising mortals may provide Detroit with a hall suitable to the requirements. Until it does the hub of the automobile industry will have to worry along with the best it has, and content itself to have the annual event known as "the biggest little show," although, as entries this year indicate, aside from the limited accommodations, it has long since outgrown that classification.

**No New Concerns**—The past week was a notable one in several respects so far as the local field was concerned, not the least interesting feature being the fact that a careful survey of the situation shows that not a single new automobile company came into existence in Detroit. Where they have been coming so close together that an adding machine was required to keep tab on the total this is a truly startling condition, due, no doubt, to the fact that several who will get into the game shortly were occupied with their Christmas shopping.

**That Parts Shortage**—How seriously the threatened parts shortage will affect automobile makers in Detroit depends largely upon whom you talk with. All the manufacturers are keeping a stiff upper lip, and appear to be unconcerned. It is well known, however, that in many instances difficulty is already being experienced in getting parts, with the prospects even less encouraging the first of the year. This condition applies particularly to those producers of motor cars who are known in the trade as "assemblers," and who are almost entirely dependent upon other concerns for their supplies. The older established concerns, who were under way before the shortage loomed above the horizon, appear in a position to take care of themselves, and little anxiety is being manifested.

"One consolation lies in the fact that if the shortage really becomes serious it will result in a lot of experimental cars being kept off the market," said one veteran dealer, discussing the situation. "The old concerns will be able to pull through all right, but some of the newer ones that have just opened up and are planning big things will get some experience that will come high before it is all over, or I miss my guess." Another exemplification of the ill wind adage?

### WHY WORCESTER RUN WAS ABANDONED

WORCESTER, MASS., Dec. 18—The endurance of the Worcester Automobile Club, scheduled for yesterday, was called off because of an insufficient number of entries. The reason given is that dealers were not able to get cars at this time, and another reason assigned is that the Boston dealers did not care to go up against the rules of the contest, which required a severe technical examination at the testing plant of the Worcester Polytechnic Institute. Last year there were upward of a dozen entries in the 200-mile run, and while nearly all of them finished with perfect scores so far as the actual driving was concerned but one car was given a perfect score.

### PERHAPS A SPEEDWAY FOR COBE RACE

CHICAGO, Dec. 21—In considering a course for the 1910 Cobe Cup and Indiana Trophy races, the directors of the Chicago Automobile Club are inclined to give the preference to a speedway backed by local automobilists.

Plans for the speedway in question have been considerably elaborated. The site proposed is within easy distance of Chicago, both by steam and electric roads. The capitalists behind the speedway are willing to build the track and stands without attaching any liability to the club. They will take the chance of getting returns on the investment, either by conducting the races themselves or leasing the track to the club for that purpose.

## DAYTON AD MANAGER ON SITUATION

DAYTON, O., Dec. 20—At a time when it is freely admitted that the automobile business is passing through a second formative period, any comment or advice coming from those in a position to offer something worth hearing, and exegetical of the situation, is worth repeating. Gridley Adams, advertising director of the Dayton Motor Car Company, Dayton, O., makers of the widely known Stoddard-Dayton cars, has delivered himself of an analysis of the situation which will carry weight.

Commenting on the reported productions of the larger firms, Mr. Adams goes somewhat astray, for he says: "The real condition of the automobile industry to-day is far from what is generally understood by the outside public. They read that one manufacturer is going to build 10,000 cars, another 25,000, and still another 40,000 cars for the season of 1910.

Gridley Adams

"No one factory is equipped to turn out more than 4,000 to 5,000 cars a year. If more cars go out bearing the name of any one manufacturer, they are the product of perhaps a dozen factories, though 'assembled,' may be, in one. Their various parts are not made by themselves, but necessarily bought from part-makers or accessory-makers all over the country. Therefore, under the present condition of a great over-demand, how much regard can be given as to how one part-maker's part will bear relation to the quality of another part-maker's part? That isn't harmonious construction, but positive disorder. The old adage of a chain being no stronger than its weakest link was never more applicable than to many automobiles manufactured under some of the present rush-day methods. How many automobiles made on this 'thrown-together' plan will last even one season through? Where is there any chance of interchangeability of parts—which factory built the particular part that went into your particular car, and which you now want replaced—will it fit when it comes?"

On the "made entirely in our own factory" idea his remarks are more happy. Getting onto this subject, his remarks are pointed rather closely to the car in which he is interested, but nevertheless are based on a sound foundation. He says:

"We are not thinking of quantity. We try to see how good a car we can make. We make our parts interchangeable. We take good care of Stoddard-Dayton owners, and do it willingly and promptly. Everything of importance in the make-up of our cars (excepting the tires, magnetos, lamps, and wheels) are made in our own factory. All gray-iron castings, including cylinders, and all aluminum and brass castings are made in our own factory. All pressed-steel frames, drop castings, springs, bonnets, fenders, tanks, mufflers, and all pressed-steel parts we make ourselves; also our radiators, bodies, engines, front and rear axles, transmissions—in fact, we make 93 per cent of all the essential parts—more than is made by any other manufacturer in the world. Under these circumstances we must be modest when it comes to quantity. We expect to make only about 2,500 cars this season. But they will all be made in our own plant, made carefully, every part fully inspected, every car thoroughly tested before it goes out into the automobile world bearing the name and guarantee of 'Stoddard-Dayton.' It is for this reason that we are sure—we know—the exact quality of everything—and its quality relation to every other part—that enters in the construction of Stoddard-Dayton cars. And our guarantee to every buyer of a Stoddard-Dayton car is based upon this absolute knowledge.

"We are way behind in our 1910 deliveries and we are rather proud of the fact. It's the best indorsement of quality and guarantee that an automobile buyer could ask for."

## NEW BOOKS FOR AUTOMOBILISTS

**Vehicles of the Air**—Victor Lougheed, the author of "Some Trends of Modern Automobile Design," has, like many other automobile engineers, taken up the problem of mechanical flight. His work on this subject is represented by a massive volume of 479 pages, published by the Reilly and Britton Company, Chicago. The intention apparently has been to include between the covers complete and exhaustive treatments of every branch of art and science into which the experimenter might be led. To this end much matter has been retained which, at first glance, seems irrelevant. However, the great body of the contents is so much to the point that this fault is easy to forgive.

Of the greatest interest to all who approach the subject from the scientific point of view are the experiments and calculations of Professor J. J. Montgomery, of Santa Clara, Cal., on the laws of the effect of air currents on curved surfaces. These calculations seem for the first time to cover completely the mathematics of the question, and should prove invaluable in calculating the proper curvatures for aeroplane surfaces. Incidentally, Professor Montgomery proves that the curve should be parabolical in cross section longitudinally. This confirms the present practice of all the most prominent designs.

The practical man who is considering building a machine of his own will find abundant data. Working drawings, with dimensions, are given of the Santos-Dumont, Blériot Type XI and Antoinette monoplanes, and the Wright, Curtiss, Voisin and Cody biplanes, as well as of the Montgomery tandem monoplane glider. The information is so complete that a good mechanic could produce any of the machines almost exactly.

The patent question is treated very fully. The text of the Wright, Montgomery, Chanute, Mouillard and Lilienthal claims is given complete, with reproductions of the original drawings.

Mr. Lougheed is an enthusiast on the possibilities of aerial navigation. His idea of the future seems well expressed by the lines of Tennyson, which he quotes in his introduction:

> ". . . the heavens fill with commerce, argosies of magic sails,
> Pilots of the purple twilight, dropping down with costly bales."

He is an ardent believer in the aeroplane as against the dirigible balloon, although the book maintains a fair and impartial attitude. In Mr. Lougheed's words, "it (the dirigible) is accorded such attention as seems demanded by its present prominence rather than by its future prospects."

On the whole, the book is one that cannot be too highly recommended, both to students and to mechanics and inventors. It is illustrated by 130 drawings and 140 half-tones. In conclusion is given a very complete glossary of aeronautical terms and a list of all recorded heavier-than-air flights up to November 3, 1909, which are said to total 35,000 miles.

## WILL WORK FOR LIGHTS ON ALL VEHICLES

WORCESTER, MASS., Dec. 18—The directors of the Massachusetts State Automobile Association had its meeting at the rooms of the Worcester Automobile Club yesterday afternoon, there being present Lewis R. Speare, Boston, president of the American Automobile Association; Atherton D. Converse, Winchendon, president of the association; A. E. Lerche, Springfield; W. H. Chase, Fitchburg club; James Fortescue, Bay State Automobile Association, Boston, and John P. Coghlin and Daniel F. Gay, Worcester Automobile Club. The principal business under discussion was plans for the legislative committee, and it was voted to work for a light bill on all vehicles, and also for legislation to iron out the many little kinks which exist in and around Boston.) The rules of the City of Boston relative to automobiles are unfamiliar to many automobilists in other sections of the State and frequent arrests are made on technicalities. It is the desire of the State Association to remedy these conditions. At least, that is the announced desire, and there seems to be no reason to doube their word.

American Five-Ton Truck Carrying Huge Load of Lumber

## TRUCK SUCCESSFULLY CARRIES LUMBER

BUFFALO, N. Y., Dec. 20—One of the sights of this town is a huge motor truck more than covered—almost hidden—by a load of lumber. This vehicle, which one of the Buffalo lumber companies put into use not so very long ago, has made a reputation for itself. It is the product of the American Motor Truck Company, Lockport, N. Y., and is rated at five tons carrying capacity.

As shown in the picture, however, the load consists of over 7,000 feet of lumber, with a total weight of seven tons. The truck has been in this service for over three years, and the last report of the operators regarding the expense of operation and maintenance for twenty-two months, covering all items but driver's wages, was but $985. Of this total $285 was expended on tire repairs, leaving only $700 for gasoline, oil, waste and general repairs over a period of nearly two years. The truck is still rather frisky.

## CORBIN ENGINEER FAVORS SHORT STROKE

Among the many big problems with which the automobile engineer is early confronted, and to which he must give attention, no one has excited more discussion than the matter of length of stroke. Beginning about a year ago abroad, following the success of cars in the English Four-inch race, American constructors began to give the matter their best attention.

Even to-day the subject has not been settled to the satisfaction of all concerned. Many makers have adopted the long stroke, while many others hold to the short stroke. The advantages of the latter are briefly summed up by one advocate, Guy Hutchison, secretary and sales manager of the Corbin Motor Vehicle Corporation, New Britain, Conn., as follows:

"Gasoline motors are not like steam, relying on the slow expansion of gas, but are impulse motors, where the pressure is very high for a short time, and after that can be practically neglected; therefore the piston traveling an equal distance in the same time revolves the crank further on a short-stroke motor, thereby giving more power. The short-stroke motor has shorter connecting rods, lower cylinders, smaller crankcase and lighter flywheel, all of which saves weight. The lower cylinders give a lower center of gravity, another important feature.

"The vibration is less with a short-stroke motor because each impulse is applied with a smaller lever arm. For the same reason the strain on the transmission, universal joints and level gears is less like a hammer blow. Other advantages of the short-stroke motor are that it cranks easier, is more economical of gasoline because of its smaller piston displacement, accelerates quicker and is capable of higher speed."

**Elmira, N. Y.**—The Charles W. Bishop Company has opened a new garage on State street, near Church, with all the modern conveniences, including a repair department equipped with complete machinery and appliances.

## VALUE OF 1,600-MILE NON-STOP RUN

Among the buying public there is a tendency to place too much dependence upon speed trials and too little on reliability of endurance runs, which properly show the ability of the cars under ordinary conditions such as the average buyer is likely to meet. Speaking on this general subject, but referring specifically to the recent trip of the Jackson "Mud Hen," F. L. Holmes, general manager of the Jacobson Automobile Company, Jackson, Mich., expressed himself as follows:

"Very few people realize what a 1,600-mile non-stop run like this one means. The car was in charge of E. P. Blake, of Boston, accompanied by Dr. Charles Percival, both of whom went over this severe trip for the second time. The course followed ran from Jackson, Mich., to Bangor, Me. Runs of this character do more to demonstrate the superiority of the car than any number of races or short speed contests. Reliability and durability, together with strength and power, are more to be sought for, and 1,600 miles in the midst of winter over rough and frozen roads is a long drive, and the motoring public are not apt to pass over lightly the second performances of Messrs. Blake and Percival without realizing the full significance of covering the distance named in the short time they did and the condition of the weather and the roads. At this time of year few motorists venture on long drives, and 1,600 miles now means a strain that 7,000 miles, or a fair season's mileage average, for the ordinary owner. In fact, few cars average that distance in a year. Figure out the ride from Jackson, Mich., to Bangor, Me., together with the fact that the engine and car ran day and night, rain or snow, and that during the run the engine must not be stopped for any reason, and the magnitude of the task performed by Messrs. Blake and Percival for two successive years is apparent.

"The statistics of this run are most interesting, and show the stupendous task of the car and the component parts. In the run the motor loyally turned over without a single stop or hesitancy 3,555,000 times, during which time the carbureter delivered into its hungry and never satisfied cylinders just 7,104,000 charges of gas. Just think of the possibility of failure on this run; a deviation of a fraction of a second, a dragging wire, a clogged carbureter, or a hundred and one things would have been sufficient to have put to a stop this continuous run. Take the magneto alone, which never faltered, and which for hundreds of hours generated 7,104,000 sparks to fire these 7,000,000 charges of gasoline to furnish the propulsive energy for the 1,600 miles. This same energy and horsepower developed on the 1,600 miles was sufficient to raise the car into the air a distance of 560½ miles. There is also another interesting point, and that is the nervous and physical condition of the men who have twice made the trip. It's marvelous!"

## PHILADELPHIA TRADESMEN TO HAVE HOME

PHILALELPHIA, Dec. 20—At last week's annual meeting and election the showing made by the Philadelphia Automobile Trade Association was so encouraging and the future prospects so bright, that the much-discussed project of a clubhouse, when revived, found a large majority of the members in a receptive attitude, and, as a result, President Wister appointed W. J. Foss (Pierce-Arrow), Allen Sheldon (Premier) and A. E. Maltby (Winton) a committee to secure suitable quarters. This committee went to work at once and after a thorough search secured a lease on a portion of the building now in course of erection at the southeast corner of Broad and Callowhill streets, about midway of "Automobile Row." The plans contemplate a suite extending across the entire front of the building, with meeting, committee and dining rooms, secretary's quarters, kitchen, lavatories, etc. Here will be established a clearing house for the local automobile trade, and quarters for visiting tradesmen. Secretary J. H. Beck will be on duty constantly, and it is proposed to ultimately extend the accommodations to include a comprehensive automobile library and tourists' bureau, where travelers may obtain information of all kinds. The new quarters will be ready for occupancy about March 15.

## INJUNCTION AGAINST PRICE-CUTTERS

NEW YORK, Dec. 20—In a trial case, which has just been held, it appears as if the pernicious price cutting resorted to by certain small dealers may be stopped once and for all. The Circuit Court of the United States for the Southern District of New York has just granted an injunction against cut rate dealers who handle the Klaxon Warning Signals, in the case of the Lovell-McConnell Manufacturing Company, et al, vs. the E. J. Willis Company.

From the papers on file in that case, it seems that the Klaxon signals, which are covered by numerous patents, are sold under a conditional license fixing the retail price of the large model, type L, at $35, and the smaller model, type S, at $30, with a maximum discount of 5 per cent. for actual cash and that certain cut rate houses have recently been selling for retail at a price considerably less than the license price.

The owners of the Klaxon patents decided to make an example of such offenders and upon their complaint the E. J. Willis Company was obliged to submit to a decree signed by U. S. Circuit Judge Lacombe, ordering the injunction asked for.

It seems that the Federal law with respect to fixing the license retail price of patented articles is well settled and that the Klaxon people will have no difficulty in stopping every price cutter. It may be of interest to our readers to know that the decision in the above case follows a well settled principle of patent law established by many Federal decisions. (See 166 Fed. Rep. 117; 159 Fed. Rep. 175; 123 Fed. Rep. 424, and cases there cited.)

## FRANKLIN PLANT STILL EXPANDING

SYRACUSE, N. Y., Dec. 18—The H. H. Franklin Manufacturing Company has bought four parcels of land on the south side of West Marcellus street, between Harbor Brook and Magnolia street. The consideration is private. The company is now owner of the entire frontage on the south side of West Marcellus street, between South Geddes and Magnolia streets. Each parcel extends back to previous holdings of the company. It was stated by representatives of the company that the property was obtained for future use rather than for any immediate building proposition. The West Marcellus street frontage from Geddes street to Harbor Brook is already built upon. The new move rouses expectations of more factory extension for this rapidly growing business.

## 23,000 CARS REGISTERED IN OHIO

COLUMBUS, O., Dec. 11—The State of Ohio has issued 23,000 automobiles. License-tag number 23,000 was given out to-day to Miss M. L. Ferrin, 3666 Reading Road, Cincinnati. Fred H. Caley, State registrar of automobiles, estimated that fully 40,000 cars will be registered by the department during 1910.

## AMERICAN AUTO EXPORTS STILL GAINING

In the monthly summary of exports and imports published by the Department of Commerce and Labor the increase in American automobile exports to foreign countries, principally European, shows a very marked increase over even as good a year as 1908. This continued setting of the tide away from us is a most welcome sign to such American firms as are about to engage to a greater or less extent in the bid for European business.

For the month of October the exports were 338 complete cars and parts sufficient to bring the total value up to $522,769, as compared with 106 cars and a value of $213,775 for last October. As an indication of the class of cars exported, however, it should be noted that the average value per car has fallen from $1,560 of October, 1908, to $1,300 per car for this October.

For the whole year, including October, the statistics show that 2,764 cars were exported, the total valuation of cars and parts reaching $6,622,626. The former is an increase of 44 per cent over 1908, while the latter improves on last year's figures by 47 per cent.

The detailed figures by countries follow:

| Country | Month Oct., '09 | Per Cent Change | '09, Inclu'g October | P. C't Change |
|---|---|---|---|---|
| British North America | $157,314 | 221.0 | $2,120,600 | 102.5 |
| United Kingdom | 121,208 | 91.5 | 1,839,772 | 14.6 |
| France | 29,839 | 435.0 | 789,735 | 46.6 |
| Mexico | 57,682 | 90.0 | 375,153 | 50.6 |
| Other Europe | 20,533 | 96.7 | 302,968 | 49.6 |
| West Indies and Bermuda | 12,643 | *19.2 | 232,137 | 69.4 |
| Italy | ..... | ..... | 214,430 | *3.3 |
| British Australasia | 30,226 | 91.3 | 192,337 | 156.0 |
| South America | 11,235 | 219.0 | 158,701 | 56.0 |
| Germany | 3,154 | *45.0 | 157,974 | 3.9 |
| Other Asia and Oceania | 58,433 | 473.0 | 138,216 | 20.0 |
| Africa | 13,336 | 918.0 | 59,123 | 700.0 |
| Other Countries | 3,985 | 1,270.0 | 25,828 | 24.6 |
| British East Indies | 2,587 | 1,420.0 | 15,652 | *33.9 |

*Loss; all other gain.

During the same two periods of time the imports showed a marked increase over last year, but not in any such proportion as the exports above. The month, in fact, showed a loss of some $36,654, but the year revealed a gain of $612,508, with figures of cars $2,509,271, and parts $740,455.

All countries but Germany and the United Kingdom showed a loss for the month, the year's figures being about the same in this respect. In the table above attention is called to the value of our exportations to English-speaking countries, or those controlled by English-speaking peoples, these amounting to three-quarters of all cars and parts exported. In imports the same does not hold, France—losing steadily each year—furnishing this year slightly more than half.

**Los Angeles, Cal.**—The White Company is building a 185 by 55-foot garage on Flower street between Twelfth and Pico, which will accommodate 140 machines. The entire front is to be finished in white tile. A 50 by 69-foot salesroom is included.

**Employees of the Mechanical Department of the New York Pierce-Arrow Branch**

This picture, taken on the roof of the building occupied by the Harrolds Motor Car Company, 233 West Fifty-fourth street, the Metropolitan agents for Pierce cars, gives some idea of the magnitude of the business done there.


**Combination Hose and Chemical of Fire Department, Westfield, Mass.**

The above illustrated fire apparatus, which is fitted to a Pope-Hartford chassis, has been in active service since last July, and has proved its efficiency on more than one occasion. The local authorities state they would not go back to the horse-drawn equipment, even if the cost of the new outfit was double what was paid for it

**Very Long Taxicab Trip**—One of the longest taxicab trips on record was recently made in the South by W. P. McManus, of Chicago, in a Cartercar. Mr. McManus is a big, busy man, who appreciates the value of time. He was at Atlanta, Ga., and wanted to make the run to Savannah, stopping at several small towns on the way and looking after business matters. Being desirous of saving as much time as possible in the transaction of this business, Mr. McManus engaged a taxicab from the Savannah Taxicab Company, which was going to be driven after the Atlanta show to Savannah by W. C. Mahoney. It is understood that a special rate was made for the whole trip. Another feature connected with the incident which makes it rather interesting is the fact that upon the arrival of the car at Savannah Mr. Mahoney discovered that a baby daughter was awaiting him at his home.

**New Brake Lining**—Cactus cloth, the outgrowth of Burbank's efforts to put the cactus plant to some use, may turn out to be just the thing the automobile business needs. During the past year J. D. Maxwell, designer of the Maxwell line of automobiles, has tested various brake lining materials and he now states that cactus fiber is not only the equal of asbestos, but possesses a number of qualities which make it highly desirable for the new purpose. Though no definite information is given in regard to the process by which the new material is made, it is stated that the braking and wearing value of the various materials tested rank as follows: Cactus fiber, asbestos, cork, red fiber, camel's hair, hickory blocks boiled in oil, hickory blocks, dry; cast iron.

**Capital Stock Increased**—With business better than ever before, many concerns are extending their field of activity. To do this it is often necessary to have more capital, so we hear of many increases in capitalization. Among the New England makers who have been forced to this step is the Gilbert Mfg. Co., New Haven, Conn., which has recently taken over the F. E. Bowers Company, New Haven, the latter being the manufacturers of the well-known Bowers carbureter. The company has had a very successful year and under the new officers expects an even better one in 1910. The new officers are: F. E. Bowers, president; E. B. Spalding, treasurer; L. F. Meyer, secretary, and W. A. Rutz, sales manager.

**Now an Aeroplane Magneto**—With the rapidly increasing use of aeroplanes has come about an incessant demand for a magneto of especial lightness, but just as reliable and dependable as any other able to be used on these air machines. Lavalette & Co., makers of the Eisemann Magneto, have brought out a new magneto built especially for use in aeronautic work, which is lighter than those used in motor cars, though every bit as powerful. Part of the instrument is made of aluminum and the heaviest model weighs only 16½ pounds, while the lightest of the four-cylinder type weighs but 11 pounds. The company is now in a position to furnish from stock five different styles of this new magneto.

**New Parts Company in Indianapolis**—The field of parts manufacturers in the Indiana city will be augmented by the Stutz Auto Parts Company, located at Tenth and Canal streets. This corporation has been recently organized to make and sell the Stutz rear axle and transmission. The latter will be made in two sizes, one for 20-25 horsepower and the other 30-40 horsepower, both three speeds, and operated selectively. The officers of the new company are: H. C. Stutz, president; H. F. Campbell, secretary and treasurer, and C. E. Stutz, general manager.

**More Baltimore Taxicabs**—Plans are on foot to reorganize the Stewart Taxicab Company, of this city, with a nominal capital of $100,000 by well-known local capitalists. While the company intends to operate in Baltimore and add about twenty-five additional cars to the present service, it expects to eventually extend its operations to other large cities. The idea of the company is to take over the entire livery business of Stewart & Company, including taxicabs, horses, vehicles, etc., and retain Mr. Stewart as Baltimore manager.

**Protest Against Raise in Rates**—With a number of other automobile manufacturers the H. H. Franklin Mfg. Co., Syracuse, N. Y., has protested against the raise in rates recently made by the Trans-Continental Freight Association for shipments across the country. The manufacturers are seeking readjustment or postponement until shippers and carriers can get together. The interest in the change may be judged from the fact that the Franklin bill amounts to $75,000.

**Pope Mutual's Smoker**—The eighth annual smoker of the Pope Mutual Benefit Association was held in the dining hall of the Pope Mfg. Co.'s factory at Hartford, Conn., Thursday evening. Albert L. Pope, Charles E. Walker, Wilbur C. Walker and A. W. Pope were present as guests. The business report showed $1,500 in the treasury. During the past year $1,200 has been paid out in sick benefits and $150 in death benefits.

**Fire in Racine, Wis.**—The plant of the Racine Mfg. Co., a manufacturer of automobile tops, was destroyed by fire December 12. The loss was $600,000, of which $250,000 was covered by insurance. The fire started in the mill room of the plant, which comprised six buildings and occupied a city block.

**Trucks from Bay City, Mich.**—An automobile truck manufacturing company, under the name of the Toeppner Bros. Mfg. Co., has been organized by a dozen or more local capitalists, with a stock of $100,000, of which half is paid in. The new company absorbs the Toeppner Bros. Carriage Company, and will use the latter's plant temporarily.

**Lectures to Be Continued**—So interesting have the free monthly lectures of the New York School of Automobile Engineers become that the management has decided to continue them throughout the season. At each one of the sessions the building at 146 West Fifty-sixth street has been uncomfortably crowded.

### IN AND ABOUT THE AGENCIES

**New Selling Agency for Q M S Parts**—It is announced by the Q M S Company (Quincy, Manchester, Sargent) that a new selling firm has been organized to be known as the Motor Parts Company, which will hereafter handle their automobile specialties. Of the new concern, W. D. Sargent is president, F. F. Kister secretary and treasurer and C. H. Holbrook, sales manager. The general offices of the Motor Parts Company are located at Plainfield, N. J., from which point the territory east of Detroit will be covered. In the West their automobile step business will be taken care of by John C. Hoof, with offices in the First National Bank Building, Chicago. On their Auto Cle Wrench business, as in the past, the Factory Sales Corporation, 1438 Michigan avenue, Chicago, will act as distributing agents for the Western territory, and the Frank Mossberg Company, Attleboro, Mass., for the Eastern territory.

**Speedwell in South and West**—The Speedwell Motor Car Company announces the following agencies for 1910: Capron-Wright Automobile Company, Omaha, Neb.; H. G. Carter, Los Angeles, Cal.; Hickman & Diggs Automobile Company, Sasramento, Cal.; Racine Auto & Boat Company, Seattle, Wash.; Speedwell Motor Car Agency, Birmingham, Ala.; J. B. Alsop, Richmond, Va.; W. W. Lynn, Lynchburg, Va.; Gentilly Automobile Company, New Orleans, La.; Houston Electric Appliance Company, Houston, Tex.; Edward Moyle, Savannah, Ga.; T. W. Simpson, Abilene, Tex., and the Escambia Motor Car Company, Pensacola, Fla.

**Chalmers-Detroit, Philadelphia**—A change has been made in the title of the firm which will represent the Chalmers-Detroit car in the Quaker City. A few weeks ago George W. Hipple, the manager, authorized the statement that the title would be the Chalmers Motor Company, but last week it was officially changed to the Chalmers-Hipple Motor Company, with Hugh Chalmers, of Detroit, and Mr. Hipple making up the new firm. The latter is also a member of the Levy-Hipple Motor Company, of Chicago.

**Franklin, Cleveland**—The Franklin Automobile Company, which conducts a number of selling branches for the H. H. Franklin Mfg. Co., announces the opening of a Cleveland branch. This will be the tenth branch of the company and will be ready about January 1. C. H. Rockwell, formerly assistant sales manager of the manufacturing company, will be manager of the branch, being now in Cleveland making arrangements.

**Glide, West and South**—For the season of 1910 the Bartholomew Company announces the following new agents for Glide cars in the West and South: Muskogee, Okla., L. R. Kershaw; Los Angeles, Cal., W. A. Shafer; Page, N. D., Page Machinery & Auto Co.; Minneapolis, Minn., Auto Storage & Repair Co.; Atlanta, Ga., W. J. Dabney Implement Co.; Jacksonville, Fla., Fred E. Gilbert Garage.

**Everitt "30" and Matheson, Philadelphia**—The Matheson car, which for the past year has been represented in Philadelphia by a branch, with W. Wayne Davis as sales manager, will be transferred to the Wayne Davis Motor Company, which recently acquired the Quaker City rights for the Everitt "30," with quarters in the original establishment at Broad and Green streets.

**Martin and Hart-Kraft Commercials, Philadelphia**—D. P. S. Nichols, Broad and Vine streets, has landed the Philadelphia agency for the Martin motor wagon; and the Thomas Wagon Company, 1338 Race street, will represent the Hart-Kraft delivery wagons, made in York, Pa.

**Auto Supply Company, New York City**—This old supply house has recently removed from 1733-1737 Broadway to Columbus Circle, Broadway and Fifty-ninth street, where a complete line of automobile supplies, wearing apparel, tools and hardware will be carried.

**Fiat, Chicago**—The Fiat Automobile Company has a new building under construction at 2347 Michigan avenue which when completed will be one of the finest on Automobile Row. The territory is under the charge of Harry T. Clinton.

**Austin, Birmingham, Ala.**—George B. Kelley, superintendent of agencies for the Austin Automobile Company, has secured the Pullman Automobile Company as representative in this city for the Austin line for the coming year.

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### PERSONAL TRADE MENTION

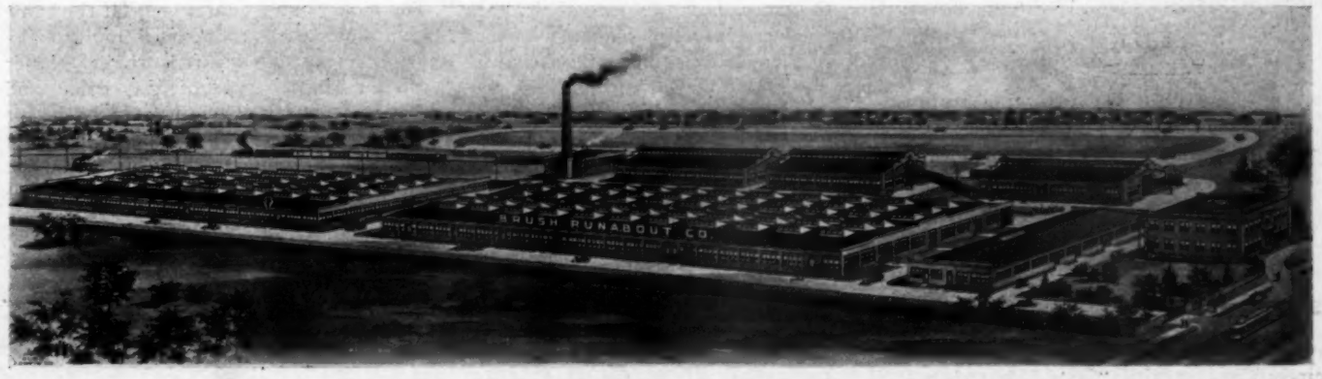
**C. W. Moody,** formerly manager of the Pennsylvania Rubber Company's Chicago branch, has accepted the position of general sales manager of the Swinehart Tire & Rubber Company, Akron, O. Mr. Moody is well and favorably known in the automobile trade, having been in the tire business for the past five years in Chicago. The Swinehart company has enlarged the factory and expects to deliver 100 tires per day duting January and February, increasing the output still more after March 1.

**Henry M. Duncan,** a well-known pioneer of the automobile industry in New York, and formerly connected with the carriage trade, is now secretary and general manager of the Westchester Appliance Company, manufacturers and jobbers of automobile accessories and supplies, with headquarters at 1315 Canal Place, New York City. Mr. Duncan is prominent as one of the most versatile after-dinner speakers, and is frequently the *pièce de resistance* of automobile gatherings.

**J. R. Windsor,** formerly of the E. R. Thomas Company, has been appointed sales manager of the New York branch of the Allen-Kingston Motor Company, located at 1934 Broadway.

**S. J. Rowe,** who has been designer for the American-La France Fire Engine Company, will in the future devote his time to the Rowe Motor Company, of which he is president.

**J. M. Hill,** according to a statement from the Alden Sampson Manufacturing Company, Pittsfield, Mass., has resigned and is no longer connected in any way with the company.

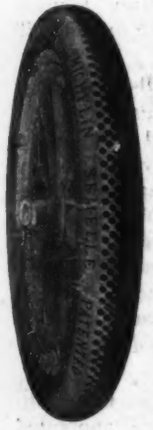



New Home of Brush Runabout Company, Detroit, Mich., with 200,000 Feet Floor Space, Covering 38 Acres

# Information for Auto Users

**Michelin Anti-Skid Tires**—The Michelin Company claims to have invented the anti-skid tire in its usual form, the familiar steel-studded leather tread. This tire was first brought out in 1905, and was used by the late Leon Thery on the Brasier cars with which he twice won the Gordon-Bennett.

The treads of these tires, as well as the wearing surfaces of the side walls, are protected by a tough but flexible band of ox-hide, which forms an integral part of the tire. In this band are riveted from three to five rows of hardened steel studs. By this construction the full resiliency of the tire is preserved, because the lower side walls, the parts immediately outside the beads, are of rubber, and permit the tire to absorb all shocks and jars, the same as any other good pneumatic tire. At the same time the ox-hide band protects the tread from cuts and punctures, and so prolongs the life of the shoe.



MICHELIN ANTI-SKID TIRE

These tires are especially recommended for winter driving in the city. The danger of skidding is very great when driving over Belgian block, brick or asphalt, especially after a light rain or snowfall. Anti-skid tires practically obviate any possibility of sidewise movement. They are made both in metric and in American sizes.

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**"Stay Shiny" and "Magiclean" Wood Polish**—Both of the foregoing articles are made by the Sterling Stove Polish Company, of Sterling, Ill., and have made a reputation for themselves through their intrinsic merit. "Stay Shiny" is a transparent liquid that prevents tarnish and oxidization of all exposed polished metals, by forming a thin, invisible coating over the surface of the metal. It produces a beautiful lustrous finish, as hard as flint and smooth as glass, that is not affected by weather, heat, rain or mud, effectively preserving the original high polish indefinitely. It is easy to apply and easy to remove when desired; dries in a few minutes and does not get sticky or greasy; is elastic, won't crack, chip or peel off. A sample of its work supplied by the makers shows a section of old brass polished and treated with "Stay Shiny" that has been exposed to all kinds of weather for three months and still preserves the original very desirable luster.


"STAY SHINY" COMES IN SMALL TIN CANS


"MAGICLEAN" WOOD POLISH

"Magiclean" wood polish is making a big hit with automobilists and is made under the exact formula of the famous German "Holz Glanz." It is a scientific liquid oil preparation, being entirely liquid, requiring no shaking and contains no solid or coloring matter, acids, soap or alkali. It puts new life into the varnish and surfaces and instantly removes all dirt, grease, finger marks, cloudiness and mud stains and does not leave the surface sticky, greasy or dust catching, but with a hard, glassy, lasting luster.

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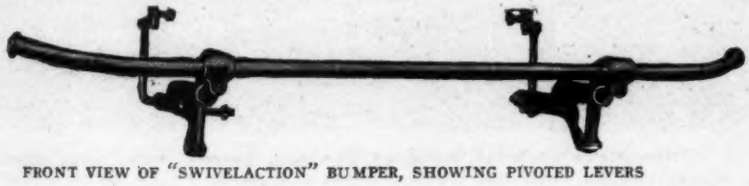
**"Swivelaction" Bumper**—Some automobile drivers should be compelled by law to carry bumpers on their cars. Other drivers, usually the most careful, provide them from choice. Of their utility there can be no doubt, both as a protection to the automobile on which they are mounted and to others.

The "Swivelaction," the bumper brought out by the National Sales Corporation, 232 West Fifty-eighth street, New York City, has several novel features, from one of which it takes its name. The bar which extends across the front of the car is connected by two swivel joints to pivoted levers working in slotted sleeves against flexible spiral springs. A blow on the full face of the bar is absorbed by the springs directly; a glancing side blow, as when turning a corner or striking an obstruction with one end of the bar, is taken care of by the swivel joints, which carry the jar to the springs. The "Swivelaction" is so designed that the bar sets higher than usual, thus affording the maximum protection to the lamps and radiator, but at the same time it does not interfere with the cranking of the motor. The springs are carefully tempered and provide for a compression of 1,500 pounds.



FRONT VIEW OF "SWIVELACTION" BUMPER, SHOWING PIVOTED LEVERS

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**Carpringco Tires**—In placing Carpringco tires before the automobile public the manufacturer, the New Jersey Car Spring & Rubber company, Jersey City, N. J., lays special stress on the fact that the tires are very carefully made by hand of the highest possible grade of materials and are subjected to a supervision in manufacture that precludes all possibility of defective material reaching the purchasers. The company announces that it has adopted a new vulcanizing process by which all moisture is eliminated during this important stage of tire making, the result being that no part of the fabric is subjected to the danger of early rotting from that and all other causes.

CARPRINGCO HAND-MADE TIRE

In the case of the anti-skid tire the leather tread and the rubber carcass are treated in such a way that separation is almost impossible, thus minimizing the danger of the leather facing peeling off, and in other ways giving trouble before it could be reasonably expected to do so. The makers also guarantee that the same high quality of rubber enters into the manufacture of its red rubber inner tubes as in the type of gray color, and that this matter of quality can be better appreciated at this particular time than in the past, as the scarcity of high-grade rubber encourages the use of compounded stock.